

# Foundation FOR UM

## **“Opportunity and Change: Technology, Acquisition, and Logistics in the 90's . . . and Beyond”**

A National Symposium Sponsored by  
the Air Force Association

July 15 - 16, 1993  
Dayton, Ohio

DISTRIBUTION STATEMENT A

Approved for public release;  
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DTIC QUALITY INSPECTED 2

Published by the  
Aerospace Education Foundation

19970610 055

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 Chief, Legislative  
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### Air Force Association

The Air Force Association (AFA) is an independent veterans' organization whose objective is to promote greater understanding of aerospace and national defense issues. Among the ways AFA disseminates information are publication of *AIR FORCE Magazine*, sponsorship of a series of national symposia, and through educational outreach programs of its affiliate, the Aerospace Education Foundation. AFA is a grassroots organization. Total membership is nearly 200,000 of whom more than 38,000 are Life Members. There are 328 AFA chapters in the United States and 23 overseas. The Association has 226 Industrial Associates, and its chapters have established ties locally with more than 2,400 businesses in the Community Partner program. The Air Force Association was incorporated in the District of Columbia on February 6, 1946.

### The Aerospace Education Foundation

On May 1, 1956, the Air Force Association established the Aerospace Education Foundation (AEF). The Foundation was established as a nonprofit organization in order to formulate and administer AFA's educational outreach programs. AEF is supported through tax-deductible contributions. Over the past thirty-six years, the Foundation has made progress in educating AFA's members and the public about the critical role aerospace development plays in the modern world. By doing so, the Foundation promotes a greater understanding of technological advancements and aerospace education. AEF's scholarship programs also encourage higher education in the technological career fields. The Foundation sponsors symposia, roundtables, workshops, contests, and many other programs in order to highlight the full range of educational interest of AFA and to help meet the growing need for scientific and technological expertise.

# General Ronald W. Yates

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## "Depot Maintenance Competition — Leveling the Playing Field"

Thank you, Monroe, and ladies and gentlemen. I'm happy to be here particularly as we start, as [AFA President] Jim [McCoy] said, what I hope to be a new tradition and one which will be a good balance to the Air Warfare Symposium that was conducted earlier in the year down at Orlando. So let me thank [AFA Executive Director] Monroe [Hatch] and the AFA for picking this ball up and running with it.

I think we're onto something that can be advantageous for us all. One of the goals of this gathering is to promote a better understanding of both the Air Force and industry's directions and concerns on the vital issues and focus on our ability to provide solutions. Plus, we hope to develop and strengthen the Air Force-industry partnership approach to providing superior aerospace capabilities for our nation. That partnership has proven overwhelmingly successful. Our victories in both the Cold War and the Gulf stand as testament to its success. However, as futurist Alvin Toffler said, "Nothing is more dangerous than yesterday's successes." Or in the words of management expert Peter Drucker, "Whom the Gods wish to destroy, they send forty years of success."

We've had our decades of success, and the world has changed dramatically as a result of it. But neither we nor our nation can afford to let that success destroy us. Instead, we must adapt and build on that success.

That's what makes the theme of this symposium, "Opportunities and Change: Technology, Acquisition and Logistics in the '90s and Beyond," particularly appropriate today. And one of those areas where change meets opportunity most clearly is in the depot maintenance competition program.

Ironically, though, this is also an area

where misunderstanding and misrepresentation have clouded perceptions to such an extent that some of our partners in industry are having trouble seeing the opportunities depot maintenance competition offers them.

I accept some of the responsibility for this. I made a reference to dinosaurs at an AIA meeting in Fredericksburg last fall that gave dinosaurs more publicity than Jurassic Park has recently given them. Today I hope to clarify that issue so all of us can recognize the opportunities that competition presents and reap some of the benefits of it.

Inventor and businessman Charles Kettering once said, "The world hates change, yet it is the only thing that has brought progress." One of these changes that promises to bring real progress is the one that allows our depots to compete for work.

Until a few years ago we were prohibited from this. What that meant was, basically, that there were two pots of work, one pot that we put on contract to industry, another pot that we kept in-house within the depot.

When work was categorized as organic, it was accomplished in-house and was never open for industry participation. Now, because of the change that allows us to compete, industry has an opportunity to bid on the organic workload that was previously unavailable to them.

What I'm saying is that we've now got three pots. You've got the original pot that was put on contract to industry. But out of the organic pot, we created another pot. That second pot is available for competition. The value of that second pot, of workload for FY '91 through '93, is \$800 million.

That means that because of competition, industry now has a chance to compete for \$800 million worth of work that they never

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even had a chance to compete for. But what it also means, according to the law, is that our depots have the opportunity to compete for the work that was previously done solely by industry. That's about \$600 million worth of work.

But as I'll tell you in detail in a few moments, we don't intend to compete for any significant portion of that work. Current legislation caps the amount of depot maintenance work that industry can perform at 40 percent. This is something I would very much like to get lifted. I believe 100 percent of our workload should be competed, either with industry or with the other services; and I'm working to get that cap lifted.

The reason I believe so strongly in competition is that I'm convinced that it is the only rational way to sort out who is best able to do any given workload at the best price, and it is also the only rational way to determine what facilities provide the best value and capability during our downsizing process.

I don't believe that competition will answer all of our industrial base questions, but I'm firmly convinced that it is the place to start. In both government and industry, competition forces efficiencies across the board. It forces efficiencies in our daily operations, in product and modification lines, in the ways we organize, in the overhead we carry, and in our facilities.

It forces us to ask searching questions about what business we really should be in and makes us get rid of our least efficient operations.

Ultimately, I believe competition is the first step in a longer process. After this beginning, say, in three to five years, someone needs to assess where this is taking us and determine if a master plan for the defense industrial base, both organic and the private sector, based on what we have uncovered through this competition, needs to be laid out.

I do not believe that you can move the master planning process in front of the necessary competitive beginning. If you do, you will be left with government making arbitrary decisions about which elements of the industrial base should and should not survive.

I have no confidence that government can make these decisions. I have high

confidence that the marketplace can, through competition. It is on this same premise that I base my consistent opposition to closing Air Force depots versus other service depots without first conducting a vigorous competition between the service depots.

If the government tries to decide which depots to close without competition, the decisions will be grossly flawed by political considerations. I certainly wouldn't want to see the same flawed decisions applied to private industry.

And in the final analysis, by driving efficiencies, competition will drive down cost so that in an era of diminishing defense resources, we will be able to provide our customers the best work at the best price.

Our depot maintenance competition has three dimensions: Private-to-private, which is work done by industry and in which industry competes with other private sector companies; public-to-private, where industry and the government compete with each other, and that's the focus of much of what I'll talk about today; and public-to-public, in which we compete with the services within the Department of Defense for that workload which has been categorized as core — that portion of our workload which we determine must be done in-house in terms of the Air Force, within the Department of the Defense, not just within the Air Force to meet our wartime commitments.

Incidentally, I believe that the percentage of work that is truly core is currently overstated. Future conflicts will not demand the same surge capacity that we needed in the past, and we previously did not give industry enough credit for being able to surge something they proved they could do during the Gulf War. What this means is that our core requirements have shrunk, so I'll look forward to more of this work being opened up for competition in the future.

To determine what workloads should be supported organically or by contract, we use a process known as Decision Tree Analysis. Workload requirements are evaluated in light of potential contract sources, surge requirements and the likely cost to determine the best way to meet the Air Force's wartime needs.

Therefore, we have already determined that the work that we contract out that is done

solely by industry is work that is best done contractually. Further, using this Decision Tree Analysis process, in our review of the \$600 million of work which was previously available only to industry, we concluded that the Air Force only had an interest in competing for about \$95 million of that work.

Of the \$95 million, \$50 million was work that was done by Canadian firms. That means that we only have an interest in competing with American industry for \$45 million of the \$600 million. That's about 7 percent of what's on contract or about 3 percent of the total competition program of \$1.4 billion.

So what it boils down to is this: For a total downside risk of \$45 million, industry has the opportunity to compete on \$800 million worth of work that they never before had a chance to compete on. But for competition to be truly effective and for industry to be truly interested in this competition, both parties must feel confident that they have a fair chance, that we're playing on a level field.

Therefore, we're doing everything possible to make sure our competition is both fair and meaningful. We conduct our competition with industry in accordance with law and the Federal Acquisition Regulation. And we are very careful about choosing our source selection authorities to be sure we avoid any real or perceived conflicts of interest.

We do not allow the commander or vice commander from any ALC to be a source selection authority when any ALC — not just his own — is competing. And of course we would never allow any individual from a competing ALC to be a source selection authority in that competition.

Even though sometimes the government buyer and seller are located at the same air logistics center, we have worked to rigidly separate those functions for the competed workloads. From the time the workload is first considered for competition, right up until after the award, there is no more interaction concerning the acquisition between the government buyer and the government seller than there is between the government buyer and the commercial seller.

All contracts awarded, whether to one of our depots or to industry, have the exact same specifications and similar terms and condi-

tions. Price and delivery schedules are set by the competitive process. In direct response to industry concerns about the lack of accountability in the depot post-award environment, we have instituted an independent air logistics center office called the Project Administration Officer, or PAO, who reports directly to the center commander. The center PAO directly monitors individual organic workloads to ensure compliance with all terms and conditions of the agreement. In other words, he continues to represent the buyer throughout the contract period of performance.

We have also established clear procedures for tracking cost performance. And, to account for the differences in accounting methods between the government and industry, and even between the different services, we use the Defense Depot Maintenance Council *Cost Comparability Handbook*. Although the joint services Cost Comparability Committee tried to make sure that all relative costs were identified and addressed, industry still raised several valid concerns.

We listened to their concerns, and we made several changes. For example, we will now list as overhead costs, costs such as our corporate headquarters staff, at my headquarters; state unemployment payments, which are made by the Department of Labor; casualty insurance, (the government is self-insured but in order to make our bids comparable we included casualty insurance in the cost of our overhead even though we don't have to pay it); impact aid for public education (where we have an Air Force base the Department of Education pays money to the local community to allow for the impact that we make on public schools); depreciation on military construction.

We're still listening, and we will continue making changes. In fact, we recently had people from seven major corporations review the handbook. But what we're finding out now is that the comments that we are receiving are less significant. As another check, the Defense Contract Audit Agency conducts an audit prior to every contract award to make sure that all factors have been considered.

By the way, I know that many of you consider the Defense Contract Audit Agency a burr under your saddle. It may give you

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comfort to know that I also consider it a burr under my saddle. But they look at us to make sure all factors have been considered, that public agency bids are not understated and that cost elements are as comparable as they can be.

In other words, and I think this is pretty interesting, when they look at my bids, they make sure that everything has been included. They make sure that nothing has been left out that should be in my bid. That is just the opposite of what they do when they look at your bid. They make sure when they look at your bid that nothing is included that should not have been included. So we both suffer — in a different way.

We recognize that there are inherent differences between the public and the private sector, with advantages for each, which keep the playing field from being truly level. We won't be able to fix some of these things. For example, private industry can take advantage of part-time employees, non-union labor, competitive sources of material, and very importantly, marginal pricing.

Government depots, on the other hand, are much more constrained about part-time employees. We must use the Civil Service System for payroll and personnel. We must buy material from the designated DoD source regardless of whether or not it is the cheapest. We do not get any abatement benefits, and we are prohibited from pricing on the margin.

However, government depots do have some guaranteed workload due to the core requirements. We are less subject to labor strikes. We may be able to take advantage of economies of scale that you may not be able to in industry. We don't have to make a profit and, therefore, also don't have to pay income taxes.

The *Cost Comparability Handbook* is not able to exactly level out all these inherent differences. In fact, that was never its intent. What it does is adequately level the playing field for cost proposals in the bidding process. And the evidence is that we are already doing a pretty fair job of this.

We are finding that the contractors who are in the same business as the depots are very good at it and are very cost competitive with the air logistics centers. In fact, when we

compete against these people, they win about half the bids and we win about half the bids.

That's an indicator that the playing field is level between like organizations. However, our experience also indicates that the Original Equipment Manufacturers, like our prime contractors, don't compete well with either the maintenance contractors or the ALCs, because they are structured for a different market — the development and manufacture of weapon systems.

As a result, they carry a lot of direct and indirect overhead, such as research and development and engineering costs, that we don't, and neither do the commercial maintenance contractors. In fact, of the Air Force public/private competition awards to date, only two had OEM, Original Equipment Manufacturer, offers, and both of them were nearly double the Air Force depot price.

On the other hand, on those same awards, we had nearly 60 non-OEM bids and almost always at least one of those was within 10 percent of the winning bid price. What this means is that if the OEMs are interested in the depot business, they're going to have to seriously evaluate how they organize.

I can't see how they'll ever be competitive for depot repair business if they carry those R&D and engineering costs in their maintenance and modification business. They may want to look at how some companies, such as Rockwell, have recently reorganized.

What is important, though, is that industry recognize that they're getting a fair chance at competition. Otherwise they'll never take the major steps required to be competitive. Lester Thurow, the dean of the Sloan School of Management at MIT, says, "A competitive world has two possibilities for you. You can lose, or if you want to win, you can change."

There may be a lesson for the aerospace industry in what the shipyards went through a few years ago when the Navy began competing for ship depot maintenance in 1985. Originally the commercial competitors had problems competing with the Navy depots. In recent years, however, they recognized the Navy shipyards as serious competitors.

So they sharpened their pencils and found better ways to compete, and now they're winning a large majority of the shipyard

competitions. I'm convinced that the private aerospace industry can do the same thing if they adopt a similar attitude. The opportunity is there; and in some cases it's going begging.

For example, we want to obtain the best value in selecting a repair source to maintain the C-17's F117 engine. That's the Pratt & Whitney 2040 used commercially on the L-1011 aircraft. Originally our analysis showed that organic depot support was best for this engine because of cost and surge capability.

However, because our requirement has declined, we decided to reevaluate industry's participation. Based upon this further analysis we found that only one company expressed interest, and that was for \$100 million more than we calculated it would cost us to do the work ourselves.

We can't afford a \$100 million premium or the risk of going sole source to a private contractor. Since this engine is being used by two or three airlines who are doing in-house maintenance, it would seem there's an opportunity out there for others eager for our business.

Ultimately, there are two elements of our industrial base. Jim used the term "military-industrial." There's a military side, organic in-house depots, and obviously there is the commercial industrial base. And both have their places. Both of us are downsizing and changing to reduce overhead and lower our costs.

Industry has cut their manning by 24 percent. We've cut ours by 22 percent. And even if we kept all five ALCs, by FY '97 we'll still have reduced the floor space in those five ALCs by 16 percent.

At Air Force Materiel Command we are absolutely not interested in maintaining our depots just to sustain our workload. Our only motivation is to provide the lowest cost support to our war fighting commands.

If we're not the lowest cost providers, then we're more than willing to close our depots. The simple fact is that if industry or another service is less costly, then we can't afford not to go with them. If they are more costly, we cannot afford to go with them.

The only way to sort out what share of the workload each of us should do is through competition. But competition does not have

to mean conflict. It is a win-win-win-win proposition.

For us, it drives down the whole cost of our operations. That's a win. Just in the FY 1991 to 1993 time frame, our depot maintenance competition has saved about 38 percent of the program value to date, savings that we were able to pass on to our warfighting commands.

Plus, it makes us and our depots more efficient. That's another win. Because even if we lose, we learn lessons which we can apply across the board to our organic core workloads.

For the private sector our competition program is making a great deal more work available while also driving efficiencies that will yield benefits in the long-term competitiveness of the industry. That's a win.

For the taxpayer, it means getting the best defense for the buck. That's a win.

We think we're on the right track, and the recent BRAC [Base Realignment and Closure] deliberations appear to bear this out. During those hearings, our competition program, including competition between the services, received what we perceived as a clear mandate from the top leadership at DoD. We see our depot maintenance competition program as very much a part of the strong partnership that has proven so successful in the past. We're listening to what industry is telling us to make that competition as fair and as balanced as possible.

We're also listening to strengthen our partnership. Not long ago Rick Millman, the President of HR Textron, suggested to me that I consider including our partnership with our suppliers as part of our mission statement. Just last month at a meeting of the command senior leadership we adopted his suggestion. Now our mission statement reads, "Through integrated management of research, development, test, acquisition and support, we advance and use technology to acquire and sustain superior systems in partnership with our customers and suppliers."

This addition highlights industry's fundamental role in our partnership, a partnership whose success brings to mind the words of John F. Kennedy: "The American by nature is optimistic. He is experimental, an inventor and a builder who builds best when called



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upon to build greatly.”

Now, through competition, we are inventing a new dimension to a proven partnership. And I am optimistic that together we will

continue to build greatly a prosperous and secure future for our nation in the 21st Century. Thank you very much.

## Question & Answer Session

"Depot Maintenance  
Competition —  
Leveling the Playing  
Field"

7

### General Ronald W. Yates

**GENERAL HATCH:** *That's an excellent start for us, General Yates. You have certainly made a very definitive statement there. We have a number of questions, and as you might imagine, at least seven of them refer to the Wall Street Journal article last week in which both you and General Carnes have been quoted. Would you like to put that in perspective for us, please, sir.*

**GENERAL YATES:** Well, General Hatch, I think what we have here is a difference of opinion. I mean, you know, that seems to be very newsworthy. It's kind of baffling as to why, but nevertheless, it is.

I don't see it the way General Carnes sees it. He stated his opinion clearly. I think I stated mine clearly. During the course of the interview, the *Wall Street Journal* reporter said to me, "Well, I don't quite understand this. I mean, he's the Vice Chief of Staff. Why don't you have to do what he says?" And so I said, "No, you don't understand the way the Air Force is organized. I don't work for the Vice Chief of Staff. I work for the Chief of Staff, just as General Carnes works for the Chief of Staff. It's the Chief of Staff and the Secretary of the Air Force, in the final analysis, that decide what they're going to do."

So this is a period of discussion, and General Carnes and I see this differently. And that's about what's going on. I think there was another article — when was that, the day before yesterday — in the *Wall Street Journal* which illuminated that. And I think I made clear today here what my views on this subject are.

**GENERAL HATCH:** *You certainly have. I'll interpret this question. It's a question from industry talking about the length of the competition process and focusing on trying to win long-term weapons systems support*

*contracts. How long will the competition process take, because industry can't wait too long to find out whether it's going to have the work for years to come? Can you break that up into pieces?*

**GENERAL YATES:** Okay. Well, let me take a shot at it. I think I'll take it in two pieces. For those parts of this competition program as we have laid it out, this is the normal competitive process, with draft RFPs and comments on RFPs and responses and source selection. And we can all probably universally agree that this takes too long. And so, as always, we are looking for ways to improve this.

And, by the way, I think that those of you in industry will agree that in the last few years in the Air Force we have dramatically improved our RFP process and our communication with you. So in the spirit of continuous improvement, we're looking for ways to make that better. But right now it is what it is.

We're all used to what that time frame is, and there's nothing that makes that particularly different from any other work that we are doing. So I think that based on the nature of the competition, nominally, that's 18 months or so, I would say.

But I think there's another question there, and that is, what about long-term depot support for an emerging weapon system? Maybe that was the gist of the question. How do we know what we're going to do when we first field a weapons system? And how would we be able to count on that for years in advance? For instance, if I took the B-2, I will tell you that we have a clear understanding of what we are going to do in terms of depot support between now and the year 2000. And it is essentially contractor support.

In the year 2000, we have to decide what

we do beyond that. I would tell you that I think that's a fairly stable commitment in that regard. So, you know, I would use that as an example of what we're going to do.

Let me make one other comment. I do not believe that I want to see the government end up in a long-term sole source relationship with anybody for the repair of our weapons system or any major component thereof. If we have adequate competition in the industrial sector, then I'm happy. But we have to make sure that the government has the flexibility to reenter the competition should everybody but one guy drop out.

So we will cover our six in this regard. I'm not interested in being sole sourced. And will I pay a premium up front to ensure the government does not end up in that situation? You betcha.

**GENERAL HATCH:** *Thank you, General Yates. There is another question in that same line. You were talking about the B-2, and it asks for plans for the B-1 in the future.*

**GENERAL YATES:** Well, we have an organic depot for the B-1 set up at Tinker. Now, it turns out that while we are about, in terms of subsystems supported at Tinker — these are not exact numbers — I think we are about 75 percent organic. But many of the critical subsystems on the aircraft, we are still using interim contractor support for.

Frankly, that interim contractor support is getting to be unaffordable for us. And this is part of what I was just talking about, about being sole source for our long-term depot support. And so we need to get more competition in that process. It's just not something that is affordable over the long period.

**GENERAL HATCH:** *The next question — and you spent some time talking about the level playing field between government and industry — but it asks a specific question about how government calculates overhead rates.*

**GENERAL YATES:** Okay. Well, let's see. That's a specific question, and let me give you a general answer. We have a worksheet which we go through which, if you look at the worksheet, will tell you all of the things that we consider at the depot that are considered as part of overhead. Those things then get allocated to the program through the normal

process. I mean, it's like any overhead process, it's an allocation process.

I don't know if I missed the intent of the question or not. Maybe somebody wants to raise his hand and be more specific. But if the nature of the question is exactly what the content of the overhead is, rather than run through all those things I mentioned, four of five of them here in my prepared remarks that we just added, but the other things are listed right on the calculation sheet, which I will be happy, by the way, to provide during the course of this conference. As a matter of fact, I'll just commit to do that. We'll make copies, a couple hundred copies of that sheet and lay them out on the table and you can pick them up. If I am completely off base here — yes sir?

**AUDIENCE MEMBER:** *Does that include depreciation of facilities?*

**GENERAL YATES:** Yes. Yes. That's one of the changes you asked us to make that we've made.

**GENERAL HATCH:** *Any other clarifications on that? Another explicit question, General Yates, about the air logistics centers having an option to no-bid as industry does. Is that in the plan?*

**GENERAL YATES:** Do they have an option to no-bid? Oh, yes.

**GENERAL HATCH:** *That was the question that was asked.*

**GENERAL YATES:** As a matter of fact, you can consider that whole pot that I discussed of things that we put out for industry, to the extent that that's been opened and we can now bid on it, to the extent that we don't bid it, it is a no-bid for us. Most of that work, we're not the most competitive people for it.

Let me tell you something else that we face, that you face too. Bidding on something is an expensive process. It takes a lot of money, and it takes a lot of people. So when we first started this, novices that we were, we were spending about half a million to a million dollars on a \$300,000 contract. So even the government can figure that one out.

So we got ourselves out of that business. So a lot of these things are too small for us to bunch our muscles up on. So there's a lot of stuff — and then there's the larger category of work where we, frankly, looking at your capabilities, are not competitive. And so when

we're not competitive, we're not going to waste our time and dollars and people trying to enter the market.

**GENERAL HATCH:** *To change horses on you, General Yates, as part of our tour this morning of the laboratories, we could hear an increasing focus on dual-use technology. There were a lot of very interesting things going on. It's obvious that's a top-down management focus. You might expand on that a minute or two.*

**GENERAL YATES:** Okay. Well, this is obviously something that is top-down and really does come from the top. It comes from the President. But clearly it is something that I'm very interested in too. Let me tell you how interested we are in this, and we will talk more about this during this conference.

We have established a lot of processes and offices and tried to facilitate, flowing to you in industry, what we are doing so that we stimulate new ideas, that you don't reinvent the wheel, that we make ourselves a lot more open to you than we have been in the past.

Now, that's one element of it that we'll talk about. But there's another element too. If there is something that we need — and by the way, I would make this same comment to a non- aerospace audience — if there is something that you need, that you think is commercially attractive, you need to let us know about it because it may very well be that while we

are doing research with a military orientation, that for a little bit of money I can change the direction or make an add-on and serve two purposes. I can meet the military requirement and I can also serve a commercial purpose.

I'm certainly willing to do that. And so we are trying to solicit where you need help. By the way, there has been, again, in the ongoing controversy, a lot of discussion about, "Well, what about this in-house research capability and do we spend too much of our resources on in-house research versus industry and academia?"

Seventy-five percent, 75 percent of all the dollars I spent in science and technology go to industry and academia. So there is a relatively small percentage that maintains the facilities and pays the people that work in-house.

**GENERAL HATCH:** *Thank you very much, General Yates. General Yates will be with us this afternoon, and after the next speaker we'll have a break and there will be a press conference. If anyone had a question that we didn't get to General Yates, please take care of it at the break. We really appreciate all the support we've had here and we're looking forward to a great symposium. General Yates, you got us off on exactly the right start. Thank you very much.*

**GENERAL YATES:** Thank you. Thank you all.

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## **"Some Thoughts on National Security and Industrial Base Issues"**

Thank you, Monroe. I just heard from General Yates that he too marched in Eisenhower's parade, and he looks so young as compared to you and me. But I want to echo General Yates' comments and thank and congratulate the AFA for having this government-industry forum because I think there are some issues that really do need discussion and debate, and I can't think of a better way to do it.

Now, for those who might have thought that this was going to be the definitive battle to the death between Tyrannosaurus Rex and Triceratops, I'm going to disappoint you. General Yates and I, though we're pictured by the press as being poles apart — and you get that view I think between him and General Carnes — in my view, we really agree on a lot more than we disagree on. And though we may disagree here and there, amongst him and me or others, I'm convinced he — and I hope he thinks that I and others — is working to try to improve the process.

I agree, and though he hasn't said it I'll say it, that I think the transition between AFLC [Air Force Logistics Command] and AFMC [Air Force Materiel Command] was a masterful job. And, General, I hand it to you and your management team for having done a terrific job there.

Having been, back in the good old days anyway, when we were your supplier — see, I don't work for you either, you know. On the F-22, that program was, and I suspect still is, the best one I have ever seen from integrated product development to openness. Not just at the program level but right on up to the top where we are really trying to solve problems together.

We agreed that somehow we had to reduce overhead rates, we had to rationalize the

industry. That was the prime stimulus for General Dynamics eventually rationalizing with Lockheed. And so I'm convinced that AFMC in general, and General Yates in particular, and I agree on a heck of a lot more. We may have some philosophical disagreements on who should be doing what in a broader scale, but I think it's great, Monroe, that the AFA has gotten together this gang.

I'm not going to talk so much — I know General Yates would be a little disappointed if I didn't mention the public/private balance a little bit — I'm not going to talk so much about that, and I don't have a lot of — he had a very good and definitive talk.

I'm going to throw out some ideas that I think we all need to worry about. They may sound a little pessimistic, and I think I'm basically an optimist too. But the best optimist is the one who keeps an eye on his six, as Ron said, and I think there are some bogies pulling in that we need to watch out for.

And we need to think about the big picture and how it can affect us both in industry and in government. So I've got some thoughts that I want to run by you to stimulate your thinking. I have no definitive answer. On many of them maybe there is no answer, but that's what I'd like to do.

I think it's useful to look back in history and see when we're talking about things like National Security Policy, things like force structure, cost, flowthrough to look back at history. And I've asked my guys to pull together a chart that shows defense costs in constant dollars, not then-year dollars where a lot of people look at it, back for the last hundred years. (See Chart 1 on next page)

And what do we see here? We see peaks of spending that responded to acute challenge. Americans were particularly good at respond-

## NATIONAL SECURITY POLICY: THREAT / RESPONSE --- HISTORY

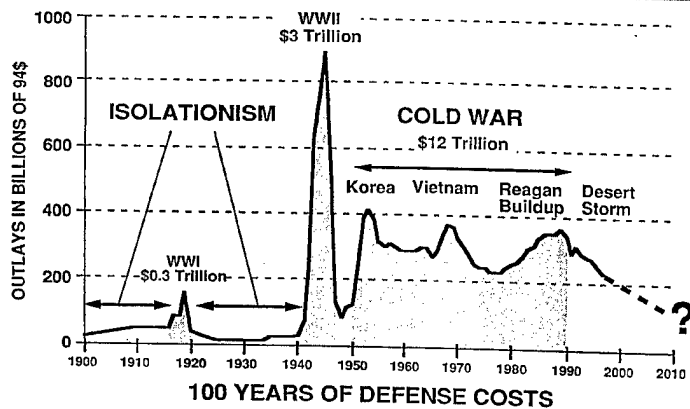


Chart 1

## National Security Policy: Threat / Response — Options

- ❖ Superpower
- ❖ World Policeman
- ❖ Team Player
- ❖ Isolationist
- ❖ Other

Chart 2

ing to the acute challenge of Pearl Harbor. We did it to Sputnik, as we'd see if we had a chart that had NASA spending. World War I, Korea.

But in between these periods we've had kind of a mixed behavior. In the early days it was isolationism. We basically said, "Let the other parts of the world worry about it." We were headed that way after Korea when the Chinese came across the parallel and we went to war with the "dirty commies."

Then we had 30 years or so when we spent \$12 trillion fighting the commies. I basically think of that as the philosophical religious war. Not the same kind as this one, I would submit. Your freedom was tied up in it, but it was communism versus capitalism. It was atheism versus Judeo-Christian beliefs.

A lot of things tied up, and it boiled up here in Korea and it boiled up in Vietnam. It boiled up — well, it started again when Ronnie Reagan basically spent [the Soviets] out of existence. Us too, almost. They lost slightly before we did.

But the bulk of the money was spent here relating to this chronic situation. And so that raises the issue about what is going to happen out here. Will it be this kind of chronic response, that kind of chronic response, will there be another acute response? I don't have the answer, but I think it's worth thinking

about.

What options does the United States have as we look ahead? (See Chart 2) Well, we could be a superpower, but it's hard to be a super power if there isn't a super threat. And I don't see a super threat around. World policeman — Desert Storm I think might have given us a false opinion there. I think all the services did a terrific job. But quite frankly, who won? Did we win?

This isn't an Army audience, but I was told by one of my West Point buddies once that you don't really win until you get your infantry in his parliament with fixed bayonets. And we did a terrific job, but we sure didn't have our infantry in his parliament and now we're back at it again with Tomahawks.

How about a team player? That's sort of the UN analogy. Are we really content to go along with the UN? We aren't going with the UN into Bosnia, really. Somalia doesn't seem to be really the kind of thing we've got a Marine Corps to do.

Or might we go down and degenerate to this or something else? I don't know. But I think these are questions that really raise the issue of what will be — what does the public want? What is their support? (See Chart 3)

And if you equate public support to de-

fense spending, which I think makes sense and, quite frankly, [Deputy] Secretary [of Defense William] Perry came out the other day after I had this talk put together and he said he didn't see anything improper about a cost-based strategy.

You can only have the strategy that you can afford. And clearly it's projected that what we could afford back against those dirty commies, we can't afford today; or the public

doesn't want to support it. (See Chart 4)

So what are some of the military options that we have? Well, if you break it down into type of warfare, we've come from strategic nuclear, which I would, sort of tongue-in-cheek, call clean and cheap. Twelve trillion dollars ain't cheap, but nuclear war or a nuclear stalemate is certainly clean. And I tell you it was a massive success, and the U.S. ought to be real proud of it — and it only cost

**"Some Thoughts on National Security and Industrial Base Issues"**

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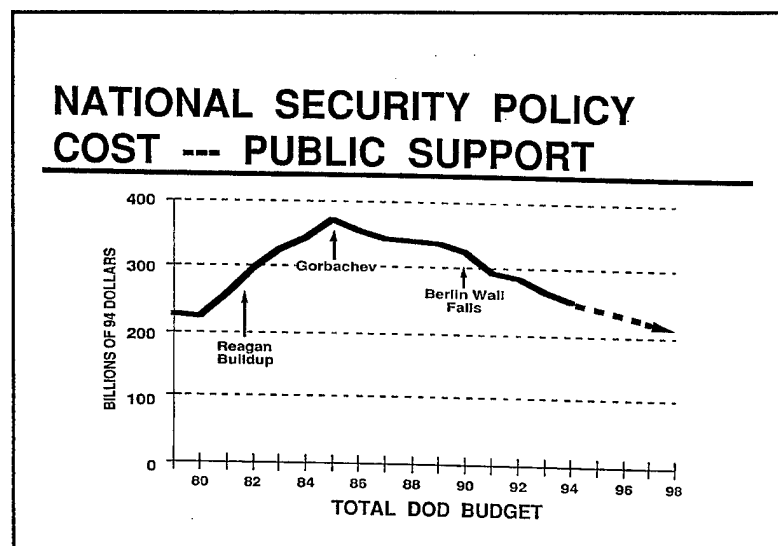


Chart 3

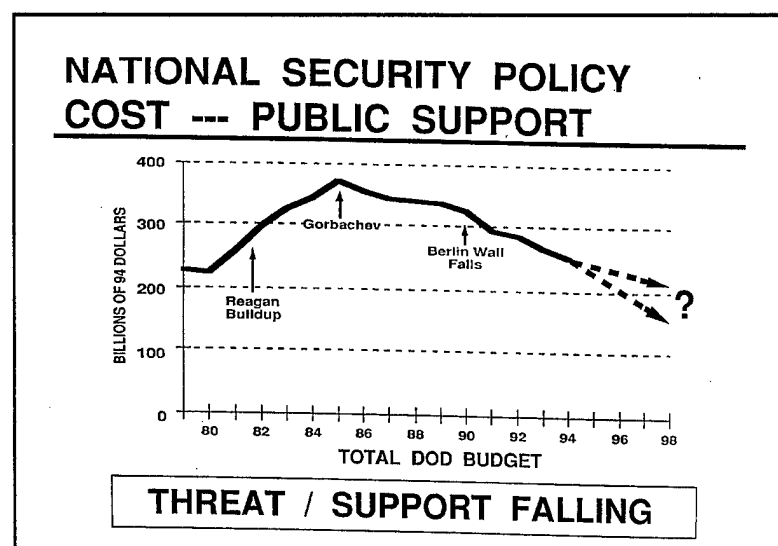


Chart 4



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\$12 trillion.

I would submit to be a tactical conventional superpower is a lot more expensive in bucks, and a lot bloodier. And I think there's an unwritten policy of no body bags, no casualties. So I have trouble figuring out how we're going to be a tactical super power, quite frankly, if it's a constrained budget and no body bag policy.

Some other missions have been suggested (See Chart 5): Humanitarian, Somalia, anti-terrorist, drug enforcement and others. Those are adding new costs to an already underpaid acquisition system in people and whatnot.

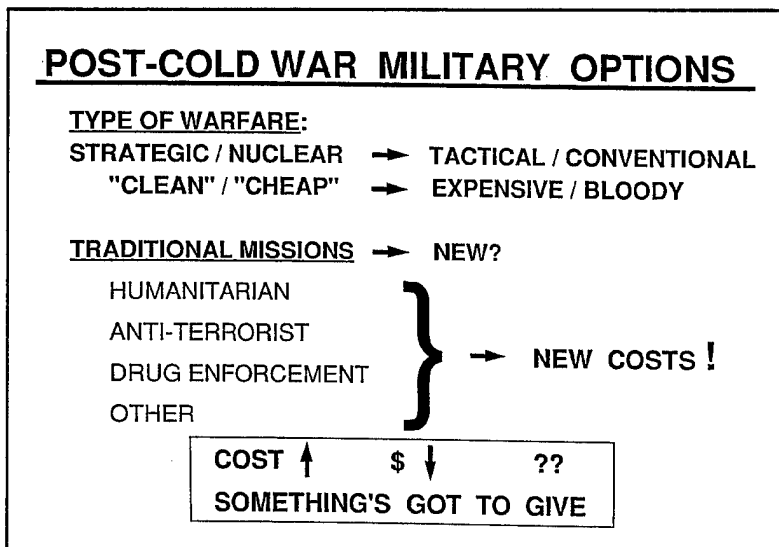
So it seems to me, with costs up, bucks down, maybe a no body bag policy, something's got to give. And I hand it to the new administration for taking this head on. And even though I guess I'm a Republican, this crowd seems, at least at the top of the pile (we don't have a middle of the pile yet), this crowd is really facing the issues. Secretary [of Defense Les] Aspin, Perry and [Under Secretary of Defense for Acquisition and Technology John] Deutch are really facing some issues that I think were ignored or mishandled by at least some of the last group.

I see Jack Welch here, my good friend, and he was one of the few trying to swim against the tide there. And, Jack, I want to thank you publicly for what you did for our country.

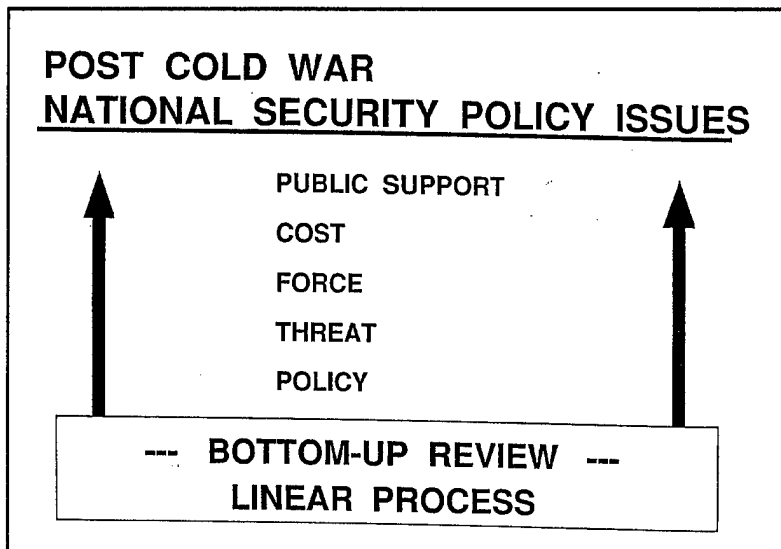
But here are some issues that I think tend to be a set, and the bottom-up review basically is a linear process looking at these. (See Chart 6)

I don't know which way you start, but Secretaries Perry and Deutch, and the few helpers they've got on board, I think should be given great credit for taking this issue head-on. And hopefully we'll have a report out of them soon.

The only problem that I see is I don't



**Chart 5**



### Chart 6

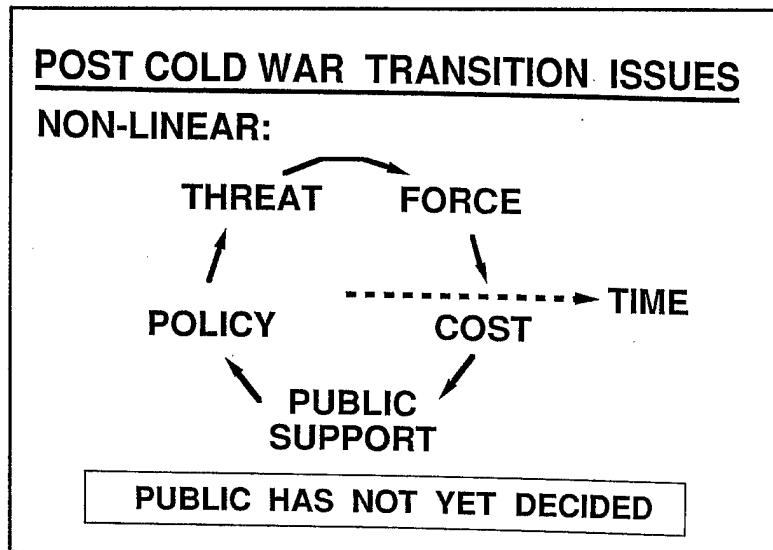


Chart 7

think this is a linear process. (See Chart 7) I don't think they do either, really. But I see it as, basically as a closed loop where your threat is a function of what force you have, or your force is a function of your threat. Certainly your force drives your cost. Your cost has to have public support. There's a cost-based

### Defense Industrial Base Issues

- ❖ Critical Capabilities
- ❖ Public / Private "Balance"
- ❖ "Tooth" / "Tail" Ratio

Chart 8

policy — you can go one way or the other, and it has to be basically a closed and complete loop.

We add to that the complication that time is moving along and people are beginning more and more to become aware of what it really means to be in the UN, how much it costs to be a tactical superpower, deficit reduction, all these multitudes of issues that boggle the brain. And this becomes a very complicated problem, and I think the public is the key. And I don't believe the public has really spoken yet.

And so when I hear win/hold/win, that

strikes me as a good trial balloon, but when the public gets the costs of win/hold/win or what threat that will resolve, will they support it? Who knows. But until we get that loop closed, then sizing and confidence in what the future will be, I think we better be on our toes and have quick-thinking leaders running the place like General Yates and General Carnes. And I mean that.

Let me shift gears and talk about the Defense Industrial Base. (See Chart 8)

On the basis of critical capabilities, one of our favorite topics is the public/private balance, and another one, not too popular in some circles, particularly on the logistics side of things, is the tooth to tail ratio. That's Jim Schlesinger's description, not mine.

On the critical capabilities, I want to just whisk by these because I want to leave some

### Defense Industrial Base Issues

- ❖ Critical Capabilities
  - ◆ Submarines
  - ◆ Strategic / Space
  - ◆ Armored Vehicles
  - ◆ Aircraft
  - ◆ Others

Chart 9

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time for questions. (See Chart 9)

I'm a member of the DPAC or Chairman of the Defense Policy Advisory Committee. DPAC is a bunch of CEOs who advise the Under Secretary, whether he wants the advice or not.

And basically we're looking at Defense Industrial Base issues, giving some thoughts in private on critical capabilities. Without violating this, sort of walking about the public view, I'll just give you Anders' view for what it's worth.

And we're in a lot of these businesses. Submarines, one of the biggest problems, but such a problem that it's almost I think relatively easy to resolve. I've got my solution. Newport News has theirs, and it's going to be one or the other, and it just boils down to that.

There's not enough demand to satisfy two suppliers, so we're basically going to have one supplier in some form or another. Strategic space probably needs some resolution in the satellite area. But they're helped by the increasing market in commercial space.

The launcher area, I'm in the launcher business. We feel that the real threat there is the entry of the so-called non-market economies, Proton and Long March who pay 35 bucks a week for an engineer where it costs us 35 bucks an hour no matter what.

No matter what engineering we drop, we

can't compete with that. And so that's a threat.

Armored vehicles, pretty good shape.

Aircraft, still over-subscribed, still too many players in my view. I don't know whether competition . . . if we have that many competitions we'll be able to neck it down. And the first real step there, maybe the only real one in the rationalization of that sector has been the GD-Lockheed merger and removal of some of the excess capacity. But I think further rationalization is needed. And then there are some others, but I won't spend our time today yakking about that.

And of course there's the public/private balance issue, which has gotten, you know, a lot — maybe more debate than it deserves.

But at least from my perspective, and I think General Yates and I will agree that we have efficiency and productivity falling because the public and private sector, the whole industrial base, have just a hell of a lot more capacity than we have demand. Whether it's maintenance or whether it's OEM [Original Equipment Manufacturer], we have it. We have the ability to satisfy the demand a couple times over.

And so we lug around, even when we have major downsizing and whatnot, we're still lugging around excess capacity that eventually works its way into overhead on both sides. And the DoD with its number of units coming down and increasing excess capacity gets kind of in a death spiral. Basically end up buying nothing but overhead.

And that was the problem in the F-22 that General Yates brought out. I think we together have made a major step by reducing the number of suppliers and some of the capacity.

And a chart that some of you have seen before. (See Chart 10) I have depicted this in a simplistic way to basically depict the capacity issue as a bucket, not necessarily in equal size, but at least balanced to solve the Cold War issues. But with demand, the water in the bucket on both sides, that is too low. There's not enough demand on either side to get the kind of efficiencies we have to have so that with our future weapons system acquisitions we get some reasonable costs with the fewer

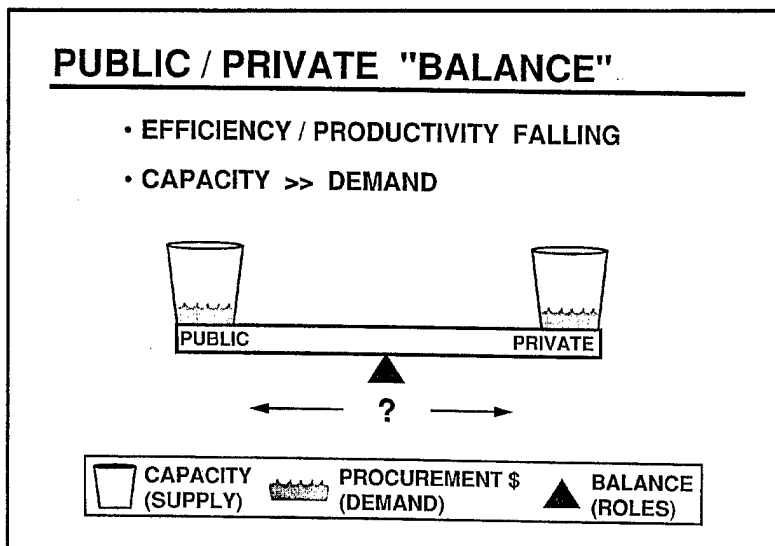


Chart 10

numbers.

Well, the only way to adjust it is to move some work; and that's basically the issue of the public/private. And whether you do it by competition or by policy, there are flaws in both directions in my view. Basically it means shifting that fulcrum. And as I've spoken in the past, if you shift it toward the private sector, that's what I call privatization. And if you shift it toward the public sector, I call that nationalization. Some have chafed under that, but I don't know what else to call it.

But what are some clues as to which way it's going? (See Chart 11) Figures don't lie; but liars can figure. And I hope that these are reasonably accurate numbers. I think they are. They come out of the Air Force Green Book as best we can determine. But it seems a little ironic to me that, while private sector investing has been coming down, which you'd expect since we won the Cold War and the major threat seems to be gone and we are over-capacitized, it looks to us in industry that particularly the Air Force and the Navy have been still making — or at least were making, post-Cold War — major improvements, major capacity additions in their side of the balance.

So if it's moving this way, it looks like it's moving in a nationalistic direction.

In another area, employment (See Chart 12) — and, boy, I tell you, these numbers are hard to find, so you can basically pick whatever numbers make your case. I, of course, wouldn't do that; but other speakers would.

But it looks to me — and frankly, it satisfies my gut feelings that industry has been moving faster than DoD in downsizing.

So I must hand it to the Air Force when the AFLC was condensed with AFSC [Air Force Systems Command] into AFMC — you guys here in the audience really did make a cutback. Whether you're still doing that is up for debate.

But it is harder to get rid of excess people in the government than it is in industry. It's painful in both, but this is another measure of which way that balance is going. And at least

## "Some Thoughts on National Security and Industrial Base Issues"

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### CAPITAL INVESTMENT

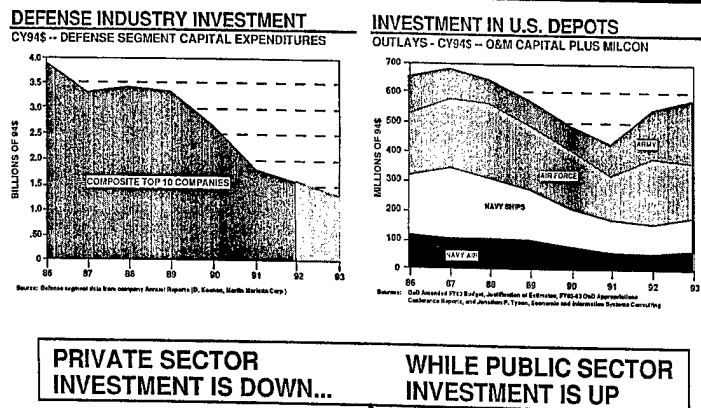


Chart 11

### EMPLOYMENT

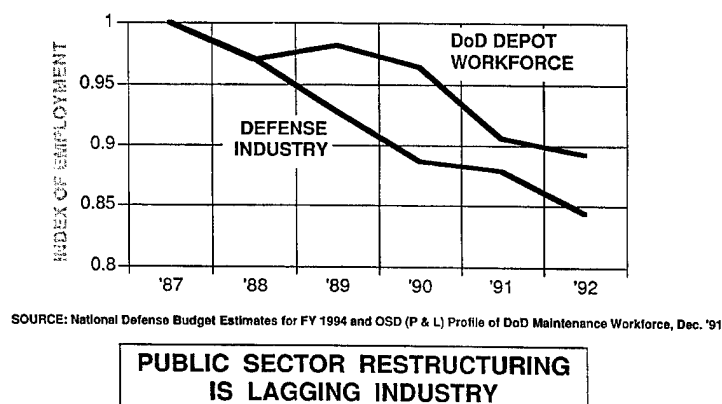


Chart 12

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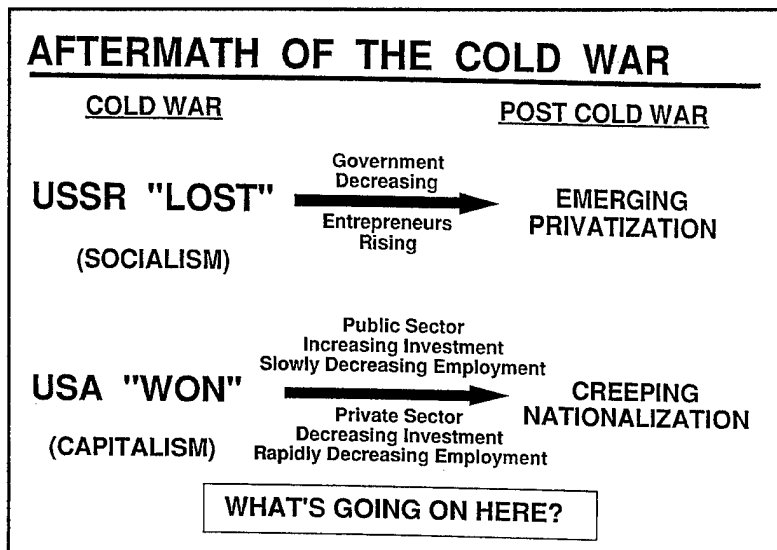


Chart 13

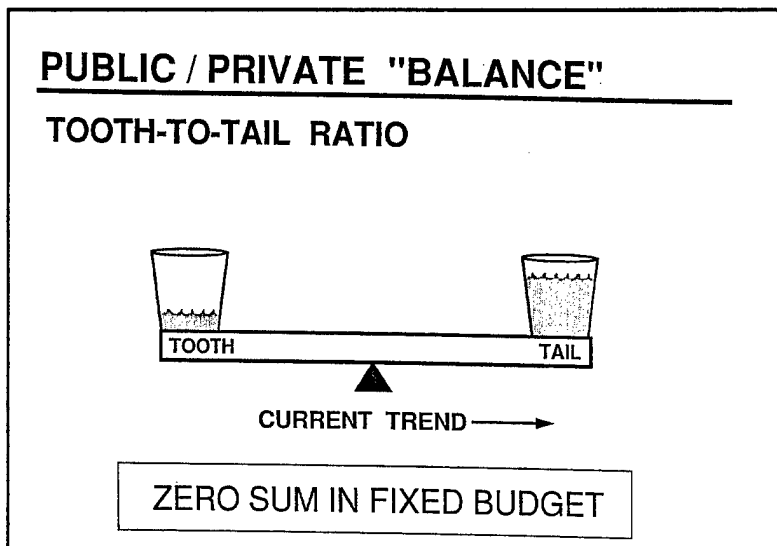


Chart 14

my perception is it's this way, and my numbers support that.

So where does that leave us? If you look at the Cold War, the USSR socialists lost. The USA capitalists won.

(See Chart 13) But while they have decreasing government and rising entrepreneurs, it seems to me that our public sector, relatively speaking, is increasing. Investment is going up, employment isn't going down as fast. Private sector is going down faster in both investment and employment.

It is ironic to me, and I've got strong reactions out of certain quarters on this one before, it's amazing that we have Russia with emerging privatization and the US with what I consider creeping nationalization.

I just don't know what's going on. Is this right? I don't think so, but everybody's entitled to his opinion. Even if I don't make it out of here alive.

I think a more fundamental issue, and one that you Materiel Command people really have to think about, is what Jim Schlesinger called the tooth to tail ratio. (See Chart 14)

We are in a constrained budget. We do not only have reducing bucks, we have a reducing head count. And so if indeed that's the trend — you can guess what my guess is — then inevitably, the tooth gets shorter as the tail gets larger. It may be stronger, it may be fatter, but I think we all have to admit that it is a zero sum game in a fixed budget.

And frankly, I would hate to see a situation, being an old Air Force fighter pilot, of the Air Force maintaining Navy airplanes while Navy pilots are out flying Air Force missions. And if this is true — I don't know where else it can lead. But I didn't come here to start fights. Just to raise issues.

Anyway, to wrap it up, you've got some major national security issues. They are multidimensional. It's not simple. It's almost impossible, if not impossible to resolve — probably impossible to resolve for any fixed period of time. It's going to be something that has to be worked out over time.

But the most important thing is it's under debate. And to the Air Force Association and General Yates' Materiel Command, I as an industry guy not only thank you for having the opportunity to speak, but for just getting

everybody together at these critical times and talking about it. I think the transition will take time.

Whatever comes out of the bottom-up review, and therefore the budget, in my view, is transitory. And my guess is that the next time around it will be by our militaristic Cold War measured standards worse, and after that worse, and worse again. But maybe then I'm

not an optimist, maybe I am a pessimist.

But whatever it is, I think the outcome is critical for not only defense, the Air Force, public/private balance, and those kinds of things, it's very important for the nation and the world. And the key thing is that we keep having debate and discussion, and we keep having leadership on both the government and industry side. Thank you very much.

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## Question & Answer Session

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### William A. Anders

**"Some Thoughts on National Security and Industrial Base Issues"**

**GENERAL HATCH:** *There is one thing that you didn't mention. A questioner has mentioned your work on the Section 800 Panel. What do you think of the recommendations of the panel? This is the work on removing the impediments of regulations that now exist to industry.*

**MR. ANDERS:** I appreciate the honor, but I don't deserve it because I wasn't on the 800 Panel. And I think it's meritorious that Secretaries Perry and Deutch embarked on the way of trying to reduce the regulations. I've got to tell you here, I think it is very optimistic to think that much can be done.

Eleanor Spector took that on some years ago. I think Eleanor has done a great job with what she had to work with. And her basic conclusion — and we chatted about this — is that an awful lot of what appears to be nitpicky regulations that the industry blames on the services has a foundation in law, or in congressional debate.

And I am very skeptical that the legislative branch of the government, or at least some of the headline seekers up there, will relax very much.

I hope Perry is able to get the dispensation for these trial cases, but bail-out discussion and headlines and half-baked charges and firing guys who in my view are real patriots, is, I think, still going to be around in that quarter. I don't want to bad-mouth the legislature, because there are some really good people up there. But it doesn't take very many with a different agenda to screw up the regulatory process.

So I think one of the most interesting things that General Yates said is finding out how much it costs to bid, you know, and for no other reason than that I think it's great you're bidding. And I know that AFSC and AFLC did

not themselves invent all that stuff. It was basically a hand-me-down, a translation where some law was written to fix some little tiny percent of the problem.

But once those laws get on the books, it's like pulling out a fish hook. I wish 'em luck. I still have to truck around to deliver our tons of paper, and we'll let you borrow the truck.

**GENERAL HATCH:** *Another subject that you didn't touch on directly is reconstitution. Given your pessimistic scenario, if we single up and if we downsize our defense industry, what are your thoughts on our ability to reconstitute, if the need should arise?*

**MR. ANDERS:** I guess I have a bad attitude on reconstitution. I think we're going to have a hard time reconstituting. We've got to be real careful that we can even sustain a low level.

I think that's really the fundamental issue that has been debated here on this public/private balance. Even though the Air Force is going to buy less F-22's I guess, and the Navy less Sea Wolves or whatever, they're going to buy some and they're going to want to have the ability to have the R&D — which by the way you can call it a marginal cost, you've got to think that one through — but if you don't do that R&D, and if you, if the industrial OEM sector degenerates and all become a bunch of service suppliers, we can get our overhead down.

I've got some outfits that can change tank treads cheaper than Anderson Arsenal probably, but they don't do any R&D. So if you don't want to have any R&D we can compete. I'll bet you that Rockwell outfit, I'll bet you that's a service outfit. If you want to have the service suppliers, we all have them. But I'm not sure that's just what you want to maintain



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the Defense Industrial Base, which, in my view has to have the ability to do this R&D that the government doesn't pay for, and maintain at least some fundamental design teams around and some critical areas to be able to not only reconstitute, but to be able to supply the next system, whether there's a reconstitution or not.

**GENERAL HATCH:** *Any other questions from the audience? Well, if not, we want to thank you, Bill. You gave us a very thoughtful presentation. There's a lot in there to chew on, and we look forward to having you with us for the rest of the day. I'm sure a number of people will have a chance to talk with you.*

## "OSD Logistics Perspective in an Era of Change"

It really is a pleasure to be here with you this afternoon, all of the distinguished members of the Air Force Association. I didn't know so many senior officials would be here today, but that is all indicative of how serious the Association takes the issues that face us in these days and times. And also I thank General Yates for inviting me out.

I did not precoordinate my remarks with General Yates. I thought about it, but then I asked the question, who should I go to to coordinate them to get them to him? And I couldn't answer that question, so I didn't do that. Maybe I could have asked you, and you could have sent me to the right target.

I do know both General Yates and General Carnes, to start right off the bat. I really do know both of them. I respect their views, and it's going to go a long way in helping us to plot the proper course of action. These are times of change. That's what I'm going to share with you, to talk with you about this afternoon.

And there's no better time for debate than during the time of change, the early focus on change. But then there is a time for decision, and then the time probably to implement decision and maybe comment on the decision.

So we're now in the time of the debate, and that debate can be enhanced and strengthened with views from everyone, to include industry. And I am proud to see so many executives here from industry also this afternoon because your participation in this debate is very, very helpful.

Now, General Yates went down the right side of the road, I think; and Bill Anders went down the left side of the road. And what I'm going to do really is just plow right down the middle. When I was tapped to serve on the

President's Transition Team, I thought that was rather interesting to do that for about maybe six weeks. But little did I know then that I would end up being the top civilian official in logistics at OSD [Office of the Secretary of Defense].

When I was down in the Army, I used to wonder what those chaps did up there. And why was it that we were receiving some of the guidance, especially policy guidance we were getting in those days. So I guess it's fair that I have such an opportunity.

I'd like to start out by somewhat describing the situation as we see it, what is really the logistics posture, and what is the environment today, because when we talk depot maintenance or we talk supply distribution, we have to think of those in context and with the total situation, the total acquisition situation. Actually, during the Cold War — and both General Yates and Bill Anders talked about that and at least inferred some things based on that — we had a tremendous build-up.

We were targeted toward a common enemy, and all of our combatants really were focused that way. Our Congress was focused that way, our industry was focused that way. There wasn't any question as to who the enemy was and what we were gearing up to do.

Now, with the tumbling of the Berlin Wall and the Cold War behind us, we don't seem to know who that common enemy really is. And that's why we in logistics get so much help because our leaders are combatants, the tooth part of Bill Anders' talk now focuses on our business. But it also is very intriguing to have combatants doing so much in logistics. I'm just excited that General Yates, a combatant, is out here talking about logistics and what he's going to do about depots. And

some of the depot commanders in the Air Force now are really combatants. We have the same thing in the other services. And all of that knowledge, we can work with that.

We're going to fix this thing. We're going to use those combatants to fix logistics. Not necessarily to unbalance the tooth to tail, but to come up with the right balance, the right size. But in addition to the Cold War and all the buildup that we had — and that was a success story. We won with the help of industry, with a focus on the industrial base.

But then came along Desert Shield and Desert Storm, another success story. We won. I don't have a question on that. And I respond to Bill Anders, I know the answer to that question as to whether or not we won. We, in logistics, won. We were able to provide the supplies, equipment and systems to the battlefield. Even with the slow transportation system, we got them there.

The battle captains prosecuted the war very well. In fact, faster than we thought. We did not lose an awful lot of equipment and supplies. In fact, we had an awful lot left to bring home. There are many who say we should have used all of the supplies out of storage and out of depot storage, supply depot storage, as opposed to perhaps buying, and surging industry.

We didn't know how long the war was going to last, but we did know one thing: We wanted to provide the very best logistics possible, whether it was out of our supply depots or out of modern technology that industry could help us to supply the equipment with. We wanted to provide the very best logistics to the very best fighting force in the world, and we did that.

So as a result of that, though, we have a lot of excess. We have excess supplies on hand and we have a tremendous excess of depot capacity. Now, Bill spoke about the bottom-up review. That is a major initiative of the Secretary of Defense and that is to review the Department of Defense's posture, its mission and roles in totality, make some decisions on the roles and missions of the various military departments, but more important than that and more crucially, to make decisions on the size and structure of the force.

Now beyond that, and where our business comes into play, is, based on the force size and structure, roles and missions, to focus on sizing the infrastructure. The infrastructure I'm talking about is organizations, functions, personnel, facilities, which have been allowed to build up over time and are very large, very capable.

But what we've been doing is providing training, research testing, logistics, financial and other management support to the fighting force. Now, you cannot downsize the infrastructure at the same time or at the same pace that you downsize the force and the structure of the force because there is an inherent time lag. There are long lead time decisions that must be made in order to provide the right equipment, the best equipment and the supportability of that equipment to the fighting force.

So what is key here is proportional, to reduce or size the infrastructure in the right proportion to support the force. There I think lies a challenge in logistics for the collective military-civilian team.

Given this situation, what is going on? There is a tremendous reorganization in OSD both on the policy side of the Office of the Secretary of Defense and the acquisition and technology side. In fact, the reorganization is just about complete.

To strengthen the policy side, we placed three additional assistant secretariats on the policy side in order to focus the rest of the functions and carry out the objectives, the national objectives. One of the key billets that we added in policy is an Assistant Secretary of Defense for Democracy and Peace-Keeping.

We also strengthened the strategic and resources capability. Years past, many times in the services we submitted our service POMs [Program Objective Memoranda] without having the planning guidance in sufficient depth. The focus here is to have the planning guidance up front so that the service POMs have more realism.

The idea is to have strong interface between the decision to deploy forces, kinds of forces, and what areas of the world, with the development of systems and the supportability of those systems. And therefore, on the other side, the acquisition side, this area is

also under reorganization, and that reorganization is about complete.

We are also fine-tuning the logistics posture in order to provide better support, better policy guidance to the military departments. A major activity in the acquisition and technology, new activity in acquisition and technology, is economic security. Economic security is where the dual-use approach and conversion issues will be directed and policy formulation can take place.

In depot maintenance, where we talk about the capacity that we have now, the unused capacity, perhaps one of the focuses that we should have or a way to get at that unused capacity is the dual-use. That takes an awful lot of changes, an awful lot of culture changes in order to optimize what can be dual-use or conversion of that capacity to help the overall economy of this nation.

Conversion and dual-use, though, is not the total answer and so therefore we have to look at that as an added adjunct to the things that we must do to modernize logistics and have readiness of force that we need in order to support the national objectives.

We also will have some additional focus in terms of emphasizing commercial standards. In acquisition, another major activity that we have established is an office for acquisition reform. That office not only focused on acquisition in terms of weapon systems support, but also logistics reforms. The person that has been selected to head that came out of Congress, was on the Hill. In fact, that particular person wrote the law, the current law on acquisition reform; so I can think of no other person more suitable to take that on from the Department of Defense.

You know, we buy an awful lot of things to military standards. We have military standards for just about anything that you can think of. Our objective is to replace a lot of those military standards with commercial standards. We know that we can do an awful lot better and make it easy to procure a lot of our logistics items. In terms of the industrial base, that's something I will not go into in depth, but just to say that we in logistics know that we play a strong role in the industrial base question.

We believe that there has to be added

focus on this particular area. We know we need to do sector analysis — sector analysis with some level of expertise, so that we can have the proper repair capabilities and support capabilities to our forces.

We must come to grips with core, our core capabilities. I for one believe that core is not number of depots. I believe that core does not have to be done in organic depots. What it means to me is that we have to have high assurance that we're going to perform those functions to have those commodities, those items available, those processes done in a timely manner in order to support the fighting forces.

And I believe that partnering plays — industry/government partnering will play a major role in this particular area. And there are a lot of things that we can do in logistics. And getting more specifically now into logistics, I believe that the critical challenges lie in and are somewhat founded in the fact that we have a large unused capacity.

Second, as I pointed out earlier, we have a large stockage of supplies on hand in our distribution depots. Third, I believe that industry can play a much stronger role than what you currently are doing. And so how do we get at that? How do we get at solving the capacity problem? We have the Base Realignment and Closure Act — but the Base Realignment and Closure Act is not going to in itself solve the capacity problem.

From our discussion earlier today, I understand very well that manufacturers who have difficulties competing with organic depots are those firms whose business is specifically something close to depot maintenance. And it gets into the business of overhead, gets into the business of overhead that reflects R&D costs and things of that nature.

I think the overall question is, what is the industrial base need? You know the old adage, "You pay me now, or pay me later." A little bit of that creeps in there. There's no question, having come out of industry recently, that industry can reorganize its vertical pillars or the walls between various entities or set up separate cost centers to compete with organic depots and with manufacturers that specifically do those kinds of functions.

But then you probably will pay a higher

cost for other things that you buy, other services that you procure, whether they be research and development oriented or not. And so I would submit that the focus has to be looking at the total program as we decide how to resolve this particular issue.

It was suggested to me that in the level playing field question, organic depots have no penalty after a war if they do not perform up to the contract. I don't know the answer to that, but the suggestion was made to me during the break that while the playing field may be more level than what it was and while the organic depot may legitimately win a contract, if for some reason they do not perform, then there is no penalty or the penalty is not the same as it is for private industry.

I do not know that answer or whether that is a legitimate question, but that is something that we will take on in review, and I appreciate someone mentioning it to me.

We also have to focus on information technology. Out here at Wright-Patterson, we have an activity located here, the Joint Logistics Systems Center. The former commander is now commanding one of the large depots. So maybe the background for training Air Force commanders of depots is to let them command the Joint Logistics Systems Center to learn something about automation.

But we have that center located here with the focus on logistics business systems. And people refer to it as being the logistics corporate information management. The focus really is logistics business systems, logistics business processes; trying to come up with major systems that will interface across a wide range of activities in order to allow us to do a job better; systems that would give us total asset visibility so that we can have real-time supply as opposed to large depot stock; concepts by which to distribute supplies and equipment, capitalizing on industry experiences rather than the distribution system that we currently have.

Computer-aided logistics — we will also be doing something in that particular function. Many of you know that documentation of weapons systems is extremely difficult. Many of the drawings and manuals and maintenance manuals and so forth fill up rooms. It's small wonder that mistakes are made and people

don't understand exactly what all is entailed in those documents. So the CALS will go a long way in helping us to come to grips with that.

I know in the Army we feel that we have the best tank in the world, but when we fielded that tank, two battalion sizes at Fort Hood, we issued instructions to Fort Hood that said "please do not use these tanks. Take five out and run them across the terrain, demonstrate to your friends how they can run off and leave the carriers, but take them back to the motor pool and check them out very thoroughly. Please do not use these tanks."

Because in the development of that system they focused on provisioning and integrated logistics support awfully late, and they built the tank without maintenance manuals, without test equipment, that were essential to the maintenance and upkeep of that system. And so we have to provide integrated logistics support, and we have to be postured to do that.

And we have to make sure in this tooth to tail issue that we do not sacrifice the tail; that is, what is really required in order to assure us that we have, one, quality systems, reliable systems and systems that can be sustained and maintained.

On the depot maintenance question, there's an ongoing study to resolve the issue as to whether depot maintenance should be led by executive service, that is, military departments have executive service for certain functions like ground equipment, electronics or fixed wing assets. There are alternatives such as joint command or agency or committee approach, and that's a centralization type of an initiative.

There's a different approach which says power down, do the policy formulation at a higher level and allow for execution at the lower level. We don't know what that answer is. It's under study, and you can tell by the *Wall Street Journal* that there is a pretty sophisticated high-level mature debate going on.

And I have the luxury of trying to take the merit of all sides of that debate and bring it into focus in order to come up with a decision and to issue a decision about all that.

That sounds a little easier than it really is; but, you know, I'm convinced that military

departments like orders. They know how to take orders, they know how to execute orders, and they love responding to orders. But what they do have fun with, is if you have weaknesses — it is just like a football field. If your weakness is cross tackle, they will run cross tackle all day.

So until we come to grips with the issues, and put it to bed as to how the department is actually going to come to grips with the issue of depot maintenance and the issue of supply distribution — and there are others — then we will continue to debate.

But I'm enjoying it, especially being new. You see, I'm not part of the furniture yet. I just call up and say, "What do you think about this issue," and put it on the table. So I'm having an awful lot of fun. But it's great to have combatants such as General Yates participating in logistics — makes me feel extremely good.

It's great to have the CEOs out here who are really wanting to do logistics. Really. That makes me feel good because I know that together, partnering, we can get the job done, without question.

So we have to use capacity. We cannot afford to maintain the unused capacity that we have today. We just cannot afford it.

So perhaps dual-use can impact the capacity as opposed to approaching what we do with it in a different form. We have to get total asset visibility. I recall back about two years ago, that our supply line for supplying parts to things like tanks, ground equipment in particular, was something like 29 to 30 days.

Technology has proven to us that we can reduce that down, sometimes to real-time, but in most cases seven to ten days. That takes an awful lot of dollars out of the pipeline. So we must also improve our strategic mobility, and that is an area that we rely on industry for, much more so than some of the others.

And we have to leverage with technology because it is through technology that we will be able to improve what we're doing. And then we have to not be reluctant at the headquarters to issue policy and to have participation in the formulation of those policies so that as we issue them they are policies that will work, policies that people understand, and policies that we can get the whole team to implement.

So with that, I would say thank you very much. I look forward to sharing more logistics with you in real-time fashion, but that's about all I have to say to you today since I've only been on the job for a couple days.

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Change: Technology,  
Acquisition, and  
Logistics in the 90's  
and Beyond**

## Question & Answer Session

"OSD Logistics  
Perspective in an Era  
of Change"

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### Honorable James R. Klugh

**GENERAL HATCH:** *You certainly are taking on major responsibilities, Jim, and we appreciate having you here on one of your very first outings in the new position. You mentioned in your talk the depot maintenance study work that's going on. The first question asks, what is the likelihood of a defense maintenance agency? And if there is a defense maintenance agency, how will it work to right-size depot maintenance capabilities?*

**MR. KLUGH:** The first thing I would say on that is that the issues in depot maintenance will not be solved by changing the organization. The major issue of capacity, issue of cross servicing, issue of contractor involvement or involvement of the private sector, those are not going to be solved by changing the organizations, first of all.

Secondly, I would not prejudge whether it is likely that the study would conclude that an agency would have some merit. We'll see, once we get that in our hands. But should that happen, then of course the collective wisdom of the military department and industry in how to operate such an activity would certainly be sought. But what we must be all about today really is trying to solve those major issues regardless of the organizational approach.

**GENERAL HATCH:** *Thank you, sir. The second question refers to your comments again about depots, solving excess capacity issues. You mentioned dual-use as a way to solve that problem. The question is, do you believe that the government depots should be involved in commercial work, the flip side?*

**MR. KLUGH:** That could be an instance where an organic depot would be doing something commercial. But our policies, regula-

tions and laws would have to be reviewed to focus on such. I think, though, that where we are shifting is in relying on the private sector, to the extent that core logistics would allow us to, and to the extent that industry has the capability and the economic capability to provide.

As for dual-use, where I've given some thought to that is the use of our depot assets by industry. For example, in the Army there's one installation that has the most modern depot for maintenance of some ground equipment that exists. New facility. One would ask why did we build it? Well, that's the lead time that I spoke of. And in logistics the lead time sometimes is much longer than some of the decisions made in the fighting force structure.

But that facility exists. Not only is it a new warehouse with a lot of capability and a lot of capacity, it also has the most modern automation. It has the most updated MRP-2 system [Manufacturing Resource Planning-2] that exists in the Department of Defense. It is on the closure list right now; and if that list is approved by Congress, that facility will be closed.

So the real question here is, what do you do with such a system? Obviously, we should discuss and look very hard at industry use, at dual-use, that sort of thing.

**GENERAL HATCH:** *Thank you. The next question asks about, again, dual-use and military specifications versus best commercial practices. How do you look at the mil-standard regulations that we have, compared to best commercial practices, and can we find some middle ground in the future there?*

**MR. KLUGH:** I think you'll find that we will take a hard look at commercial practices. The Secretary of Defense has directed that we



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visit commercial industry with a goal of getting an appreciation of what those successful practices are out there. And there's no doubt in my mind that his objective is, where feasible, to adopt some of those practices. That includes business systems; it includes financial management systems as well.

Those are some of the things that've been talked about. So in the acquisition reform initiatives, there is a major undertaking in

there to reduce military standards, eliminate military standards where they are not absolutely necessary and rely more on private sector support than we have in the past.

**GENERAL HATCH:** *Thank you, Secretary Klugh. We are very happy to have you with us today. You have a tremendous challenge lying ahead of you, a very full plate. Good luck in your new duties and thank you very much for coming, Mr. Secretary.*

## Logistics Panel:

**Maj General Lewis E. Curtis III**  
**H.T. "Skip" Bowling**  
**Dr. Jean R. Gebman**

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## Moderator:

**General Robert T. Marsh, USAF (Ret.)**

**GENERAL HATCH:** At this time I'd ask our panelists to come forward and take their seats. Let me introduce our panel moderator, who is known to most of you, General Tom Marsh. Tom has been Chairman of AFA's Science and Technology Committee since 1984, shortly after he retired as Commander of the Air Force Systems Command.

His committee has done a great deal of good work for the Air Force Association, including producing a number of excellent papers, the most recent of which is entitled "The Fourth Pillar: Reconstitution and the Industrial Base and the Future of the U.S. Military." Ladies and gentlemen, without further ado, Tom Marsh.

**GENERAL MARSH:** Thank you, Monroe. Well, it's always good to be back with you all and see so many friends on both sides, government and industry, and participate in these activities. Well, you know, we have heard now from the top, from the policy-makers in this whole thing. Let's take a step down just a little bit and get closer to the front lines, the doers, the people who get this job done and who study it in detail. And I think we have a distinguished panel here today. First we'd ask General Lew Curtis, who I'm sure you all know as Commander of the San Antonio Air Logistics Center, to lead off.

**GENERAL CURTIS:** Thank you, General Marsh. Secretary Klugh, you know, my daddy told me not to drive down the middle of the road or the left-hand side of the road. So I think I'm going to follow my boss down the right-hand side.

But in saying that, I think what has disturbed me most over this last year and a half in listening to the debate on the Defense Industrial Base has been that much of the rhetoric — and I'll call it rhetoric — is perhaps

at a very general level and does not do justice to the subject.

Some of it comes from a level of simplicity that probably complicates the tough decisions we face. And I'll be very frank with you. Some of the rhetoric is just plain stupid. And the net result of that is we are escalating issues in a confrontational format, and that's almost guaranteed to give us a bad answer.

There are powers, centers of expertise within this Defense Industrial Base, and they do different kinds of things. What the OEMs [Original Equipment Manufacturers] bring to the Defense Industrial Base is the ability to design, develop, and manufacture equipment. What the logistics centers and the contractors who are in the logistics maintenance business bring is the ability to provide heavy maintenance on those systems.

In any environment — in today's world — where we clearly have, if not today then immediately ahead of us, excess capacity to design and develop and manufacture on the OEM side and excess capacity to maintain on the organic maintenance side and the contract maintenance side, if we embark on a course that causes OEMs to develop new maintenance capacity simply to compete when we already have an excess capacity, or if we put in the incentives that cause logistics centers to try to develop manufacturing capability in competition with OEMs, then we are all foolish.

And we need to be very careful in this rhetoric that we don't march off the end of the bridge if we are busy arguing with each other. I think, because of the level of rhetoric, there's some real opportunities that we're not taking advantage of.

Just this past week or so at San Antonio we awarded a design engineering contract.

The ceiling on the contract is over a \$100 million for engineering activities. None of the winners, by my recollection, are OEMs. But that's an awful lot of engineering dollars going out to people other than OEMs.

At the same time, we're worried about how we retain the engineering capability at the OEMs and how we bear that in the competition with the depots.

I've got a support equipment engineering contract with a ceiling of \$75 million. It has not been out there for long. It has options yet to be exercised, and yet we are within \$17 million of the ceiling and expect to be through that ceiling by the end of the year. Again, there are no OEMs involved in that.

When you look at who bids on those contracts, the OEMs do not compete. Part of that is the structure of the contracts, part of that is the OEMs' unwillingness or lack of interest perhaps in restructuring so they can compete. But how we open those hundreds of millions of dollars, quite frankly, across all the logistics centers to the OEM engineering staffs is one question that deserves discussion.

Now, clearly I am not interested in paying \$180 per engineering hour to an OEM for a task that I could buy from an engineering house for \$80 a man-hour. But I think that there are opportunities there for us to do some smart things as a community to preserve the development capability we need within an OEM structure. And that bears serious discussion that I haven't seen.

Another area of opportunity is in the modification arena. There are modifications that are very similar to the maintenance we typically do at depots and there are other modifications which have a lot of the same content as manufacturing. If I look back today at one of the mods on the C-5, we went through a lot of trouble, a lot of heartache, a lot of training developing the skills for the rewiring of the C-5. And much of that modification was very similar to what you'd expect at the manufacturing house.

Perhaps we ought to have a dialogue on how we look at modifications that carry manufacturing content where they provide an opportunity to support some of the manufacturing industrial base of the OEMs. But on the other hand, you know, I have no desire to go

out and do that in a sole source environment.

Perhaps we should look at the Competition In Contracting Act, and maybe there are smart ways to limit competition for major modifications of that sort to a group of OEMs, plus perhaps the depots.

So we ensure two things: we protect the Defense Industrial Base, but we also give our customers and the operating commands and our taxpayers the very best value for their dollars.

You know, those are two opportunities that I don't think we have worked hard enough and discussed hard enough — and we've let the rhetoric of this whole issue get in the way of it.

The third issue I'll roll out to you before I sit down is the one of foreign competition. Clearly, a lot of our allies see an opportunity in this depot competition arena. And I for one don't want to go out and explain to my work force how we lost the contract to a foreign competitor who bought into it.

And yet in all this rhetoric, I haven't seen that issue surface. And yet that's a real danger. Not only is it a real danger that a foreign competitor will compete directly, but that one of our own major manufacturers, major contractors, will buy a contract as part of an offset agreement with a foreign country.

You know, those kind of situations exist and yet we will kill this whole program if we have a major layoff at a depot, I believe, and the workload went offshore. Clearly, that does not do anything for the United States industrial base.

So those are some issues we need to address. I think we address them by stopping the rhetoric and building opportunities to sit down and talk about the real issues in a cooperative format so we can see what makes sense across the entire spectrum of issues, organic and contract industrial base, and what provides the long-term best value for our customers and the operating commands and our American taxpayers.

We need to do that quickly before we let this rhetoric get away from us and the decisions become political or develop a political bias that lacks some of the logic that this community can apply to it. Thank you very much.

**GENERAL MARSH:** Thank you very much, Lew, good charge. Next, Mr. Skip Bowling who is the President of Lockheed Aircraft Services. Skip?

**MR. BOWLING:** Thanks very much, Tom. Certainly it is my pleasure to be here, to be a part of this discussion on issues that are obviously getting a lot of attention these days. I hope, as Lew does, that the rhetoric will become policy and we'll get on to some very important issues that need solving.

It's a time of trying to make this partnership work even better and to build on the success we have had in the past. I thought it would be useful this afternoon just to share with you some of the successful experiences we in the service business, supporting depots and working with the depots and now competing with the depots, have had.

And perhaps out of some of that, you can see some of the insights that I think might be important, some patterns that we may have that might help us in the future.

But before I do that, I thought it might be useful to begin by telling you a little bit about where we're coming from. The company I represent is part of Lockheed Aeronautical Systems Group.

Lockheed Aircraft Services is in its 55th year of operation. It was not a new company. It was not a company that was created in this environment, but one that has been working on this issue for quite a while. It is a type of company, as General Yates mentioned earlier, that can compete with depots and complement the depots as we try to do that.

LAS is not an OEM company. We don't do that, although we do have the responsibility now within Lockheed for pursuing the depot business. This company has a number of domestic and international operations.

We sort of formed a network that goes around the country and the world doing both military and commercial work. And we do have, in addition to this network, I think a clear charter of the businesses we are pursuing. We are pursuing obviously the military modification business, commercial modification business, which is somewhat new, although we've been in it in the past, and then of course some international business that involves technical assistance around the world.

As I said again, we are not an OEM company; but the experience that I'd like to share with you comes today from doing both commercial, international and, of course, U.S. military work. We formed some conclusions and ideas about some things that work better than others, and I'd like to just share a couple of those with you.

The first of those really is the idea of concurrent modification and maintenance. I know this is done to some extent in almost all businesses, but I believe, frankly, that this is a concept based on our experience that can be used to a greater extent than perhaps it is used today.

Certainly, our experience in working with both government and commercial customers indicates that commercial endeavors make much stronger use of this concept than we have seen in many cases in our military experiences.

In our view, there's a big difference between maintenance in the PDM [Programmed Depot Maintenance] area, which has been a focus in some cases in the depots as opposed to the concurrent modification and maintenance business that we see in the commercial area and that we have seen a good bit in our operations at LAS, Lockheed Air Services Company.

So I strongly recommend that today we need to foster and encourage companies in this private sector that have developed the special skills to do this because I think it is the most cost competitive area to go do that. In this concurrent modification and maintenance business, let me just quickly share with you a couple of examples of some cases where we have also looked at this concurrency.

And in this case, the example involves our experience over the last 30 years in doing some very specialized work with the special operations area out at Ontario. Throughout all of these programs and perhaps throughout all of these airplanes, we have in every case endeavored to maximize the availability of the airplane through the concept of evolving maintenance—I mean modification concepts, but at the same time marrying them with the scheduled maintenance. I think that what that's done is made the aircraft more available, and I think that's been important.

One of the examples I'd like to share with you is the program we called Combat Talon — most of you are familiar with this — it is a program we've been doing for over 25 years. In this case, it's been a successful program and it has been a program in which over the period of time the aircraft, the same tail numbers, have evolved from the airplane it was in '65 to the much, much different airplane it is today, improving it, but always tying it in with the maintenance planning, so that it has always been evolving. I think it's been an example of what can be done, hopefully — especially with small fleets of airplanes.

There are other examples. One that I think we are very proud of, working with another part of the Air Force, is the Gun Ship Program. Here again was a program which was successfully modified, and all of its modifications and all of its enhancements were brought to bear at the same time that the aircraft was being scheduled for maintenance. It was therefore made available to the customer more than it would have been any other way.

The other example that I'd like to touch on very briefly is one where I think we find a great deal of success and I think is beginning to show up more and more. It is this whole question of contract and logistics support. We have had a program that I think has given us an example, the KC-10 Program, which most of you are familiar with. This program is run out of Tinker. It's been our best experience in working in the whole contracting and logistics support area. It is a program that seems to embody some of the very best features of commercial practices which we have been able to marry together with the military requirements of this fleet of airplanes.

And my plea and my recommendation is to take every chance that there can be to continue to use this kind of concept, particularly as new aircraft are introduced. For example, if the 767 came into the fleet — I know it is being considered for J-Stars. And there are some other programs like that.

Just to conclude with a couple of remarks about this whole public/private issue. I think a lot of it has been said. And I think there's no question that there are sincere efforts on the part of everyone to try to level the playing

field, to try to make it something that's more acceptable, something that takes away some of the rhetoric and perhaps brings it to a conclusion that allows the competition to be held — and with everyone having more confidence in the results. I know there's a lot of work that's been done to try to document this. The handbooks are there. Yet I guess as one who has been in the competition a little bit, we're still seeing some evidence of what I'll just call an uncomfortable feeling that we aren't quite there yet.

We see cases where the disparity between some of the bids made by the private industry as compared to government industry have, I think, disturbingly large differences. In some cases they're getting a little closer. My only point in mentioning this is that, in spite of the good work that's been done — and things are continuing — we still have a ways to go.

And it's obvious that everyone is recognizing how very expensive it is to go bid these things, that there is still work to be done in order to level the playing field and give us all the same degree of comfort. But at any rate, I think there's good progress being made in that. And we intend to compete very vigorously for these, expand our competition and go for the ones where we think we can compete.

Just as a final comment, though, it's interesting when you think about it, this business. I'm talking about programs where there's not a lot of engineering content. In order to go win this bid and be competitive and make a little money, you've got to be able to go out and bid work in the \$40 range.

Any of you have taken your car in to your local Chevrolet dealer and went to the service center and seen the sign up over the back that says, our labor rates are \$55, \$60, or \$65. It makes it interesting to think, here we are trying to get a car fixed and someone's willing to pay 60 bucks an hour for it. And we've got your C-5 in there and the price is a little lower than that. So maybe in time that will all get balanced out.

At any rate, I'm encouraged that the dialogue is taking place. The issues are obviously being surfaced, and we're proud to be a part of the process and to try to make this

partnership work a little bit better. And with that, I'd like to conclude.

**GENERAL MARSH:** Thank you very much, Skip. And lastly, we have Dr. Jean Gebman who is a Senior Associate at Rand for logistics, Project Air Force. Jean?

**DR. GEBMAN:** Thank you. If we're not careful, we're going to have a hell of a wreck on the road. We've got some people on the right side, some on the left and some in the middle. And I'm not sure where I'm at, to be honest with you.

I'm not even sure what the game is. And when you think about it, job one for the Air Force Industry Partnership is to prevail on game day. Yet the management challenge we have is we don't know when game day is; we don't know where we're going to have to play; we're not even sure what ball to bring. We may have to play a couple of games simultaneously.

This makes it tremendously difficult to know how much is enough. Never mind to explain to the Secretary of Defense how much we need for the Congress and the public. We're pleased at Rand to see the attention these days on efficiency. I've got some economists that I thought would be very pleased to hear of the competition progress, but there are some gray clouds on the horizon that I'll touch on in a moment.

So in the efficiency business, the challenge that we see for the remainder of the decade has to do with understanding how much is enough. How much design capacity do we need? In what areas? How much manufacturing capacity? How much repair capacity?

Does it really make sense for people in the design and development business to be off trying to compete for changing rivets on C-5s? Probably not. So job one to get ready for game day is we need to get our thinking a little better organized about what the range of games is that we need to be prepared to play, what the positions are that need to be covered, and then look at the resources we already have and take a fundamental relook at our current structure and whether or not there isn't a fundamentally different way to organize the resources to deal with the games on the horizon.

The second and final comment that I'd

like to share some remarks on has to do with competition. I went to the senior economist on our project and I said, "Gee, Frank, I've got great news. On the Air Force, the DoD, we're really getting into this business of competition, and here's some of the ways that we're doing it." And when I got to the part where government is competing with industry, Frank says, "Oh, but wait a minute." I said, "What?"

"There are a couple of worries here."

Many of you will probably recall the 1950s, the great war with the airlines. The Military Air Transport Service at that time was carrying passengers. TWA and Pan Am were struggling carriers. They worked through various people in Congress and in short order there was a great battle over whether it was fair for the airlines to have to compete with the Air Force carrying passengers or not.

That war went on for several years and was finally resolved with a compromise. The compromise was the Civil Reserve Air Fleet. The airlines would carry the passengers on international routes, and the Air Force would carry the cargo.

So there's an element of worry when you pit the government versus industry; government versus employer. It's a worry that also occurred over in Japan in the 1950s as Toyota was putting together its approach to lean production.

And they had a fundamental call they had to make regarding their supplier base. The choice was between their people in-house competing to do things that their suppliers would also do, or not. And part of the argument was:

"Well, if we do it, we'll get a better price." But the leadership of Toyota had another goal in mind, and that was to form a tight, trusting partnership with their supplier base. And what they realized was that it would be very hard to level the playing field, very, very hard. They were willing to try, but then they realized that even if they made the playing field perfectly level, the suppliers would still have that doubt in their mind when it came time for the close call as to whether or not they would get a fair shake. There would always be that doubt in the mind of the supplier, whether or not this was really fair.

So what Toyota chose to do in that in-

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stance was not to compete their in-house capabilities against their supplier base. Just a couple things to think about.

As we turn to the future, I think we need to really consider a serious joint fundamental rethinking of the games to be played, the positions to be covered, the resources already

available and how perhaps we should change things in very fundamental ways in order to get the most out of what we've got to prevail on game day, no matter how many games you're called upon to play and no matter what the name of the game.

### Logistics Panel

**GENERAL MARSH:** *Thanks, Jean. The first question is to General Curtis. It says that since the contractors and depots are in competition, doesn't this impede communications in the partnerships which we're trying to promote through integrated product development?*

**GENERAL CURTIS:** The answer is, you betcha. It's perhaps one of my concerns over the long-term impact of competition when we organically are in competition with our own suppliers. There's going to be on both sides an unwillingness to communicate on those things that we think are our competitive advantage.

You know, I've already seen pieces of that. It's a very tough thing to work. We competed with Lockheed recently; and I have people that don't want Lockheed to walk through parts of my maintenance shop floor. And frankly, my people that go to Lockheed say that the environment there isn't as open, as conducive to communication as it used to be.

When you view each other as competitors, you close down some lines of communication. Interestingly enough, in an IWSM [Integrated Weapons Systems Management] environment, competing within an IWSM office also has its challenges.

You know we divided the C-5 office for one competition. Half of it became the seller, the other part became the buyer, physically separated. And that was a tough competition. After the buyer's side of that won the competition, we recombined the offices; and when the buyer side walked back in, the people who were on the seller team booed them.

All of you know that in the contract world competition is tough, and you get down to fight them in the trenches. You know, an

internal competition is divisive in an IWSM office; and in fact it took a lot of work and a lot of team building to bring those two pieces of the office back together after the competition was over.

And frankly, they are not totally back together because we still have that separateness that's required for us to objectively administer the Speed Line activity as if it was a contract.

On the C-5 PDM line I can say, "Great. I'd like to have this done." And people go out and try to do it. On the speed line side I'd say, "I'd like this done." And the Speed Line company that's internal to the C-5 office says, "Great. But we want to negotiate cost and schedule with you over that." It's a different world. But the bottom line answer is yes, there are problems with communication when you compete. Thank you.

**GENERAL MARSH:** *Jean, there has been a great proliferation of engineering service organizations over the last several decades as the OEMs off-loaded certain of their system management activities, and as independent analyses requirements mounted. Now as we try to reshape and influence the formation of the minimum essential industrial base, does this present some unusual problems?*

**DR. GEBMAN:** I'm really worried about the fragmentation that we have in addition to the excesses that have already been discussed in a number of areas, and I really think we're past the point where we need to sit down and fundamentally rethink what the jobs are that need to be done, technically especially, and what the resources are that we have available and what we need to do for the future.

And to come to the table prepared to think very provocatively. Perhaps that means na-



tionalization or perhaps it means privatization of depots. To not come with any priors. And to, for example, in the instance of this particular question, technical engineering service support for a program at Lockheed might be provided by a technical cadre at Boeing in the instance of one program and vice versa on the other.

I think the situation is serious enough that we need to go back to the basics and really take stock of where we are spending our resources and technical talent and whether or not there just aren't fundamentally smarter ways to proceed.

**GENERAL MARSH:** *Skip, you said progress is being made in leveling the playing field. What problems remain? How should they be fixed?*

**MR. BOWLING:** Well, you know, most of us were raised in the environment where the customer is always right. And when the customer is also your competitor, it raises some interesting — I just think that the experience, which is new to us, of bidding against your customer is something that I guess is just — it's caused a level of dialogue that I think is going to bear fruit and going to eventually give us all the confidence that this thing can happen this way.

The other thing I'd like to think of as a positive note in that regard is when you see some of the differences that we have noted and accept the fact that some of those are due to the need for companies like ourselves to relook at our productivity, look at our processes, and sharpen our competitive edge even more. I think that's a very positive thing that's happening. And I think it's caused us to relook at some things, and I think in the end it's going to benefit us and it's going to be part of what's going to bring us closer together.

**GENERAL MARSH:** *Lew, there's been much talk about banning the mil-standards and specifications in lieu of commercial standards and so on. That's been discussed for years now. Has the situation not improved? Are we still applying the specs and standards unduly and mindlessly?*

**GENERAL CURTIS:** You know, maybe you should ask some of our contractor representatives whether they think we're applying the specs unduly or randomly. It is a tough

cultural thing to get over and use commercial specs or use the best commercial equivalent.

I'll tell you we've had a couple of support equipment buys recently where we've tried to use the best commercial equivalent to a particular item, and we have found resistance even out in industry. A lot of us and a lot of our system is structured for the definitive set of specifications.

Having said that, the initiative to move away from the military specs and to use commercial practice is a good one. Particularly in those areas which are increasing where we do not drive the market. Where the commercial customers drive the market, we in the military need to learn how to live within that commercial market.

We've done a lot of good work on commercial off-the-shelf. That's the right focus, but it's a hard one for us to get our minds around and reshape our support structure for commercial off-the-shelf. So I guess my only — if I gave us a grade on use of commercial standards, I would say it would be a C minus or a D, just because there's a lot of inertia, much of it within our processes that we have to overcome to use commercial specs properly.

**GENERAL MARSH:** *Skip?*

**MR. BOWLING:** If I can just comment on that, as an observation of a contractor that's done a lot of work both for commercial and the US government. The place where we could do a better job is in this whole area of data. We create data in support of some of our military contracts, and there aren't enough people in the free world to read all this stuff. Sometimes the cost of producing this data is so extraordinary that I think it actually begins to affect the whole competitive military balance to a substantial degree.

A lot of the things you do in actually implementing the work, the actual maintenance work — there are a lot of commercial practices that I think are beginning to come into that. But if I could pick one area that I think I see as the biggest difference in what happens to the cost of doing a commercial task versus military task, it really is in the data.

**GENERAL MARSH:** *Lew, back to your discussion. How can the Air Force exclude foreign sources from depot competition when U.S. policy supports free and open*

*trade? That's tough.*

**GENERAL CURTIS:** I didn't say it was going to be easy. But as we compete our own internal workload at Kelly, my intention is to begin the RIF [Reduction in Force] planning in parallel with that for the people involved. If I'm going to save the taxpayers' dollars by going to another source for a particular piece of our work, for example, the T-56 engine that we do today, I am not going to save any money if I don't move people off the roles that have been doing that work. But I think, you know, once you start a RIF, that becomes a very political issue. And, you know, the day we RIF people in the T-56, in a competition that is structured to protect the U.S. Defense Industrial Base, and that work goes offshore to a contractor, particularly offshore to a contractor who, rumor has it, bought in on that particular — this is a hypothetical case now, you know — I would not like to be an elected official who has to explain it.

So I think the remedy to that is going to be in Congress and the law itself that governs depot competitions. We're going to see some challenges. We typically put on restrictions. We say, anybody can compete, but their location of performance has to be in the Continental United States. That provision is under attack right now. We'll just have to see how it sorts itself out.

But I think if we lose that provision on our contracts, we'll see some interest in Congress to change the laws shaping our depot competition. And I agree with Mr. Anders. It's always rolling dice when you watch the laws change that govern our business.

**GENERAL MARSH:** *Jean?*

**DR. GEBMAN:** This is a serious area because we already see, in the commercial airline sector, the foreign companies with the labor rates starting to garner an increasing proportion of the heavy aircraft maintenance work. So if we don't do something along the lines that Lew has indicated, we are potentially headed to a point where our C-5s are being maintained by some foreign enterprise, and that's just unacceptable.

**GENERAL MARSH:** *Jean, I expect you knew you were going to get this, but you spoke of the coming car wreck and seemed to recommend an off-road vehicle as an assess-*

*ment of how to do business. Can you give us your early views of what this new vehicle will look like?*

**DR. GEBMAN:** Well, first of all, it should have wings. I think that we need to convene the top minds of industry and government and take stock. We honestly don't know even at Rand what fully goes on inside of depots or, for that matter, in any detailed terms what goes on inside of industry, how many people are involved in an essential design enterprise in both the prime and the subcontractor tiers.

I think we need a nationwide fundamental inventory of where we stand now just to be doing the kinds of things we're doing; then simultaneously we need to get some leadership from the top side to declare what kind of ball games, at least in general terms, we need to be prepared to play so that we can come to grips with this issue of how much is enough, what is the core design and manufacturing capability in the prime and the subcontractor tiers that we must preserve in order to have sufficient response down the road.

**GENERAL MARSH:** *Skip, I hope you can recall what Lew mentioned, the programs he mentioned. The question is, what may have been the constraints or considerations which precluded you from bidding on that depot work that you discussed, that had to do with design services?*

**MR. BOWLING:** Well, I think the most honest answer I could give you is that we just weren't even aware the competition was going on. We do try to look for ways to utilize our engineers to fill in the gaps between programs. And I know throughout Lockheed we do that, but this is an area that I guess we just yielded the field to some of these other companies.

After talking to General Curtis today, I know a couple of us from Lockheed are going to go back there and revisit that and see if it makes sense for us to compete. You know, it's the old Kenny Rogers thing about "know when to hold them and know when to fold them."

There are just certain things where it may not make sense for us to go after them, in a company like ours. But I can tell you that's one area that slipped by us. I was not aware that contracting was going on, and we're

going to go back and revisit that.

**GENERAL MARSH:** *May I follow up on that, Skip? You saw promise in the concurrent modification and maintenance work. And obviously that imposes, does it not, higher skill levels on you, design capabilities and so on? And doesn't that have the downside of making you less competitive as you bid this straight maintenance work?*

**MR. BOWLING:** Yeah. It does make you more selective, no question about it. The commercial folks will never put an airplane down, take it out of service for maintenance unless they intend, during that same time, to put in all the ADs [Air worthiness directives] and all the modifications that are there. Schedule is a dominant thing to them.

And that drives them. Of course, airlines perhaps are more willing to pay that cost. There are just a lot of programs that I see where it just makes sense to do this concurrency where you do have the chance to do the advanced planning so that you know what modifications are going to be made to the aircraft. And therefore you can tie that from a schedule standpoint with the scheduled maintenance.

It does mean that you have to work very, very closely with the customer, so that happens in real-time and can be planned that way. I don't know, but my own opinion is that doesn't add real cost; but it does say that there are programs like that — where you can do that selectively — where the costs perhaps on a man-hour basis, the kind of skills you have might have to be a little bit higher than they would be if you were out there doing straight maintenance.

But I think if you can somehow or other capture all of the costs both to the contractor and to the customer of doing that concurrently, I'm absolutely convinced that it's a bargain to do that.

**GENERAL MARSH:** *Lew, a very straightforward question. Can the depots maintain their cutting-edge technological capabilities?*

**GENERAL CURTIS:** We can and we do, just like everybody else does, with smart investment and the right technologies to keep us on the cutting edge. You know, we have to be very selective about the way we do it. If I

pick up a new capability under a Rep/Tech or under a prime project, it doesn't matter, that piece of equipment is still depreciated into my overall cost of doing business and impacts my next bid.

So we have to make sure that where we upgrade our technology or where we upgrade our facilities, we do it in the areas that make sense from a business case basis. And, you know, we're now operating under a lot of the same rules that you have always operated under.

I'll tell you that our systems to do that are probably a lot more archaic than yours, but we still have to figure out how to do it to keep our overhead down and to stay competitive both with you and to provide the right cost to our customers.

**GENERAL MARSH:** *Jean, I guess this is the kind of question you'd expect to ask of Rand. Granted, the threats are uncertain and sizing the Defense Industrial Base is difficult. We must still make decisions on depot and industry capacity. What criteria should we use? What threats drive the calculations?*

**DR. GEBMAN:** We've got to start with the defense guidance top side, whether it's win/hold/win or win/win. We're going to have to flesh out a lot of details ourselves in order to really do the calculations in terms of what kind of capacity we need in industry, what kind of capacity we need in logistics.

But I think that we at Rand, the Air Force, industry, need to step up to this plate and start laying out straw men for, "Here's the job we think we need to be prepared to do," and then let the folks in Congress, let the public, let the press take their shots at it and get this game plan refined so that we can then move on to the next step of making the tough choices of, "Well, how many airplanes do we need to design in the next 20 years? How much depot capacity do we need to have on line?" At the moment we just seem to be drifting, and that's dangerous.

**GENERAL MARSH:** *Lew, Secretary Klugh mentioned that if an ALC fails to perform, the ALC suffers no real penalty. Do you agree?*

**GENERAL CURTIS:** No, I don't. Quite frankly, I should hold my Speed Line company as accountable for their cost and for their

performance as I hold any contractor. You know, if a commercial activity had won the speed line contract — that's a fixed price activity with some over and above — I would not be worried about that cost.

But because this activity is living in my depot maintenance industrial fund, and any losses accrue to me, I'm going to hold them accountable for both schedule and quality performance and cost performance.

The first thing we did after we won is I sat the people involved in that Speed Line company down and said, "Understand, if you do not perform, I am going to have to look at exercising or deciding consciously whether or not to exercise the out year options with you or to go out and recompetete just like I would a commercial contractor who did not perform."

You know, the minute we won the contract we sent a letter to the Air Force Audit Agency asking them to come in and look at our performance on the contract. Now we have built a lot more structure than that. You heard General Yates talk about the PAO. You know we have a very structured process to track the performance, and the penalty is that if we don't perform, we don't exercise the out year options. And that's the way I intend to exercise all our contracts.

**GENERAL MARSH:** *Skip, do you have any feelings on that?*

**MR. BOWLING:** Well, I guess that's a part of this confidence that we're talking about. I guess those of us in the contractor business who would have a fixed price contract and, you know, you bid it with all the risks and rewards and consequences of doing that. I still have a hard time seeing how that's done within the depots. I don't doubt that Lew will try to administer that contract just the way he said. I guess my only reaction here is: it seems like it's so new that it's still to be proven. Let's see how it comes out. Will the visibility of the win and loss and the consequence of that be known to the industry to the same degree it would be if we fell flat, and all of a sudden the losses would be plastered all over the *Wall Street Journal* or whatever it is?

I mean, we live in such a highly visible area that the successes and failures are noted without any question. The thing that I guess that remains to be seen is just exactly how that

works. And I think when we see it, and see how it works, and it turns out it's a fair way of doing it, I guess we should relax and go home. But I guess it's just too new and we need to see.

**GENERAL CURTIS:** You're right, Skip. In fact, we are still trying to invent down at the bottom level how we implement these contracts and track them. We think we know. We're just going to see how well we do it. I have absolutely no problem at all in sharing the results of those with you, and so I'll undertake to do that. I have no problem with that.

**MR. BOWLING:** Just another comment. You know, it gets back to the thing that Jean was talking about. We're here now inventing new ways of doing business. Lew is having to go out and create ways of doing business within his ALC that he never had to go do before. It's because of the decision to go do this competition and the way it's happening now.

But the thing that still nags at me as someone who's been in this business — this is my 40th year now — is, is there going to be a value added to all of us having created this new competitive concept? We're having to do things, we're having to create systems and have inspections, we're having to give visibility to things that we didn't have to do before.

Which brings up the question of whether or not we couldn't have contracted that work out to the people who already have those systems in place to conduct all that. So this is sort of a more macro issue. But it brings in the question of whether or not we're really gaining advantage in our whole industry partnership for having done that.

**GENERAL CURTIS:** You know, Skip, I guess I didn't launch into this competition as a great advocate for it. However, looking at some of the early results, I have to say that I think we are producing work more efficiently and cheaper. Within the depots I know it's caused us to go back in and look and really concentrate on things like building materials and how we perform our work specs and our processes. And I'll tell you that those things we have competed on we have learned to do substantially better than we did before, whether we won them, like the C-5 Speed Line, or whether we lost them, like the T-56 gearbox.

And so, I think it has brought value to our customers. You know, there's a down side to it. I mentioned the communication problems. But overall, I think it's the right thing to do for now. The key to me is having the right pace of competition and competing the right things, not the wrong things, when you lose money and don't bring value added to all of our customers.

**DR. GEBMAN:** Lew, that's an excellent argument for why we need to have competition. The question though remains whether it's healthy to have competition between government and private or whether it might not be better to have competition government to government or private to private. And to me that's the question that's still on the table.

**GENERAL MARSH:** *You know, this is sort of in retrospect, but it's back to this whole subject — and this is to you, Lew — how do you level the competition with respect to profitability? Does the government need to make a profit? That is a still nagging question, obviously.*

**GENERAL CURTIS:** I thought General Yates covered that issue very well; but of course I thought he covered all the issues very well. Did I do all right, sir?

No, I don't need to make a profit. But there are a whole lot of other things that I do need to do. You know, I know there's a contractor sitting somewhere in an airfield and he pays a dollar a year for his airfield access and his fire trucks. And in a competition, you know, we allocate our fire trucks, our airfield upkeep and everything else into the price of that competition.

The playing field is not precisely level in every particular, and profit is one of the big

ones. But I think it is reasonably level, and I can only speak from my experience at San Antonio. But as I look across the competitions that we've been involved in, I don't see any great degree, any appreciable degree of inclination to that playing field in the aggregate. There are some bumps and holes in it; but overall, I think it's not a bad playing field. That's from a guy who has won one and lost two.

**DR. GEBMAN:** That's part of the problem potentially, that the perception of the unevenness will always be far greater than the reality.

**GENERAL MARSH:** *You know, we've all talked about downsizing based on the the threat of downsizing. Now this takes us on out and says is excess capacity driven by the need for repair and maintenance during combat a core capability, we need?*

**GENERAL CURTIS:** During combat the first thing we do is accelerate our basic weapon systems out of the depot. And so my big C-5 hangar was full at the beginning of Desert Shield and empty by the time Desert Storm started.

And heavy combat repair is generally done in the field. If it is so heavy you have to bring the aircraft back to a depot or a maintenance contractor to do the repair, in today's scenario that weapons system is already too late to reenter the fray. So no, I would not consider the heavy repair of aircraft as a core capability for battle damage.

**GENERAL MARSH:** *Well, that exhausts the questions that you all have posed. I want to thank this distinguished panel for a great session. We appreciate it very much.*

### "The Winds of Change"

**DR. JONES:** Thank you very much, General Hatch. Members of the Air Force Association, General Marsh, I am very pleased to be here. On times past I was a regular visitor here at Wright-Patterson Laboratories.

And besides having the opportunity to speak with you, if I do okay in the speech, my reward is that I get to spend a fair amount of the rest of the day with some of the scientists and engineers at the Air Force's Wright Laboratory. And I'm really looking forward to that.

I've had the job as director of Defense Research and Engineering for about six weeks now, so I'm in the Pentagon trying to sort out how you get certain classes of actions actually accomplished — completed. It is not as easy as one might think.

As someone who has spent a fair amount of time in the business community, to walk into an organization where the head of the department is called a secretary and aides to committees are called executive officers, you have to re-orient a little bit. But what I'd like to talk to you about today is the health of the research and development enterprise.

And by enterprise, I mean the organization, even the processes, and certainly the people that perform research and technology development in this country that supports national security. It is a harsh fact that the defense budget will go down 40 percent over the decade ending in 1996.

And that the market — the defense market to industry will be down over that same time period about 60 percent. As a result of that, there are gale force winds blowing across certainly industry and the other organizations that are part of the R&D enterprise. There is major downsizing occurring.

And it has come to be an objective of the Department of Defense that the defense in-

dustry and commercial industry become one industrial base serving both the defense market and competing economically, strongly internationally as well as nationally. Not if, but how that happens, I want to argue to you, is really to a very great degree not in the hands of the Defense Department but is in the hands of industry.

I want to talk about that, but I want to focus on the R&D core, a very small percentage, but an important portion of the industry that serves national security. This integration is going to happen.

Several actions have to be taken and I think are being taken. One of them is consolidation, and that is fully in the hands of industry. There is or is not in any given company proactive action to downsize, the setting of the time frame to do that, to consolidate, to select the end markets for the out years.

What can the Department of Defense do to help in that industrial consolidation? Well, one thing is to try to predict the future more realistically. Dr. [William] Perry [the Deputy Secretary of Defense] argues that the future years defense plan, the FYDP, has not just been unrealistic in the past but even counter-productive, that government program managers have had little notion of where their program was going to be. Talk to industry about that.

Industry made decisions, and for the point of view of this talk, made decisions about investment in R&D to position their companies. And, in fact, when reality came to pass it was quite clear that a particular program really had no chance of being funded. So, Dr. Perry, starting with the bottom-up review that is in progress and that I know you know something about, is trying to use that to build a more realistic FYDP to connect the planners'

vision with a realistic assessment of what resources will be available and how they'll be invested by the services, by the department.

And that's a help, if you're out in industry and you are trying to make choices about what your future markets are. But those choices, about investments, about positioning, sit with the industry.

A second action that is being taken goes under these terms. Change, the current term for this is diversification, not diversion, but diversification, in particular to take defense technology that has been developed or partially developed and harness it for a commercial application. And because that hadn't been looked at too hard in the past, because we have had a separate defense industry to a great extent from commercial industry, there are some nuggets of opportunity there.

And so industry is taking a look at that. One looks at it as a company. What is one's technology? What do you own? What can you easily acquire? What can you cost-effectively acquire in the form of technology? What are your production capabilities? What are your manufacturing capabilities? What are your service provision capabilities?

And thirdly, what kind of market strengths do you have? What is your expertise? What are your contacts? What are the strengths of your marketing force? And then make some decisions about what is a smart diversification decision.

Well, how can DoD help? And it turns out that how this might be able to be of help is more to the technology end.

And there are some things that are being done. One of them is that the IR&D [Independent Research and Development] funds, the funds that can be reinvested by industry in research and development, are much less constrained than they have been in times past. The Department of Defense has declared that defense industry diversification is in the interest of national security.

And review and evaluation of the use of IR&D funds has either been eliminated or certainly tailed off. And industry can choose to invest those funds in diversification activities. Again, industry chooses where that investment is made, not the Department of Defense.

Second, defense has some dual-use programs that I expect you know about right now. The Technology Reinvestment Project is the focus of attention because proposals are due this month. But, in fact, there are a number of research advanced technology programs that really do have a dual-use application, and there are a number of companies that have used such projects funded by the department as a vehicle to build up R&D expertise that is the basis for diversification.

And the third way the department can take action — in fact, that gives industry leeway in this integration — is acquisition reform. I'm not going to talk about that at any great length. I guess you could characterize it as a harsh fact that if you are doing defense business of a manufacturing ilk as well as commercial business, you probably have your manufacturing lines quite separate, probably physically separate because of defense procurement practices.

And there is a commitment to change those, but it will be a fairly long process, some of it involving legislation in order to make changes.

The third and last attribute of change, action that has to be taken to integrate defense and commercial industry to create one base, is that we need to keep the technology edge that's been built up, particularly in defense.

In the technology world, as those of you in it know, you have to run to keep up. A technological edge is very easily lost. It will boil down to choices that industry makes. What can Defense do? Well, one thing it can do is sustain its science and technology investment.

And I have taken to very carefully listening to what Dr. Perry says, and he has made a strong commitment to maintaining a level science and technology investment. And that means 6.1 account, 6.2 account, 6.3A account. The secretary says — in a more breezy way — he says we're going to tread water in science and technology.

And I never thought that I would come to believe that level budgets and treading water was a positive statement, but now I do. And that's a strong statement in the face of the kind of reductions that Defense is having to make, particularly in the force structure, particularly

in the procurement modernization accounts.

But to keep technical advantage, to maintain technical superiority in the security sense, it is, when it all comes to pass, going to be industrially determined what the R&D investment is. In times past, the sort of rule of thumb has been that 3 percent of defense industry revenue has been reinvested in R&D, particularly focused on defense R&D before we were focusing on dual-use technology. Industry will continue to make a decision about what the size of their own dollar, their own revenue reinvestment will be and where it's placed, how that investment is made.

There are some folks walking around who asked me the question of, "Well, you're going to see zero defense industry investment in R&D because the revenues are not there." And I think that's not the case. I think what is happening is that industry has to make a choice.

I believe that to a substantial extent that industry management will believe that it's necessary to make an R&D investment. I don't know what size it will be, and I don't know how that investment will be placed, but I believe they will not take the short-sided view of zeroing out — putting their own revenues as a reinvestment in research and technology.

Certainly those industries that have technology as a base for their products, I just don't think that's a smart business decision. What the size of that will be, I can't predict. It's very hard from the vantage point of the administration to get a clear view into that.

One doesn't usually see those kind of statistics until about two years later. So I see mostly anecdotally.

Well I talked a fair amount about integration of defense and commercial industry. My real topic is the R&D enterprise, that small portion which I view as the furnace that keeps industry warm, that small portion that is the base for technological superiority. And I think it's crucial to this country that the health of that enterprise be good.

I talked about industry. I tried making the point that the sum total of the decisions to be made mostly sit in the hands of the industrial management, not with Defense. Defense is doing a number of things to try to be a catalyst,

to try to make some smart investments in defense research, defense technology.

But I believe the form of this change will be decided by industry to the greatest extent. But there are other performers in the research and development enterprise, and I want to talk about those as well. The second set of performing organizations are universities, and the winds of change are blowing across them as well.

I have spent some of my professional life in universities as a practicing researcher and as a teacher, and I can tell you that to the university community it is a pretty rude shock to be asked point blank the question, "What have you done for economic competitiveness lately?" And that's the question being asked of the universities. This started in earnest about 18 months ago.

I think the universities are being very sluggish in replying because they're not used to being asked that question. But if you do look back over the last couple of years, one response that's quite visible is the formation of a number of consortia.

A number of you are acquainted with centers of excellence or centers for particular technologies or consortia with industry. There have been about 1,000 consortia of university/industry partnerships created just over the last couple of years, and that is in part the answer to this question of "Are you economically relevant?"

There's a strong force for change in the universities, and I think it is an opportunity for positive movement. Because while we see industry not just in defense but also in the commercial community downsizing their R&D labs, you think IBM Watson, you think AT&T Bell Labs, you see dramatic reductions.

The movement for more liaisons between industry — or partnerships between university and industry I think can be a positive change if managed well. The universities do have a separate mission from economic competitiveness, but it certainly can be used complementarily.

The third set of performers and the last I'm going to discuss today is the laboratories, in particular, the defense laboratories. I've said earlier that I'm a strong supporter, and certainly the department is strongly behind



maintaining the science and technology investment at the 6.1, 6.2, 6.3A level, but that is a minority portion of the labs. The labs are a spectrum.

They don't do just science and technology development. They are a full spectrum. They support procurement, they support in-service maintenance and evolution of systems. I think that's one of their strengths. The accounts that support those latter activities are going down dramatically.

Therefore, the laboratory system is downsizing. OSD through the bottom-up review is taking a hard look at infrastructure, including laboratory infrastructure. That is ongoing. The bottom-up review should be over this summer and some decisions made.

That's one of the winds of change over this portion of the performing organizations for S&T. Another one, another force for change aside from reduction of budget and downsizing, which is occurring in the labs, is what I think can be fairly described as a new mission, and that's dual-use.

The labs are looking outward in a way, I think to a degree, that they have not been asked to do in the past; and they're rising to the occasion. There are more cooperative agreements with industry, with consortia of industry groups and even with universities.

And the labs are acting as a catalyst to transition technology, not just one direction or the other between the labs and industry, but between companies. And I think this change is a positive one.

In summary, I think there are some strong winds of change blowing across all three sets of performers in the R&D enterprise: industry, universities and laboratories. Let me turn to a different issue, which is the question of what contribution is technology, per se, making in the context of all this change.

And I'd like to suggest that there are a couple of technologies that have a great deal of promise, and they're not just on the horizon. They really are here today.

Both of them are information technologies. They could be the basis for reducing cost and the basis for integrating defense and commercial industry, i.e., making it easier for a company to have a production line in which it builds defense products, for that product is

somewhat different from the commercial product built along the same line.

And the two technologies are first the manufacturing — the information technology to support manufacturing. One of the buzz words is integrated process product development.

It's basically information technology that underpins your manufacturing process all the way from design and requirements through the design of the manufacturing line, through the actual manufacturing process and the control of it, and into maintenance and evolutionary upgrade.

You can capture information. You can control a process in a way to make it more cost effective. It is the basis for having what is described by some folks as agile manufacturing so that you can build a few defense items by rapidly changing the parameters on line and then revert to another class of product.

Second, information technology is modeling and simulation. It's a basis for new markets, but it's also the basis for providing a set of tools that underpin what is essentially a people process to help the test and evaluators, to help the designers, to help the requirement setters by providing with them a simulation they can try out when they don't have much beyond mathematical analysis and the expertise in their heads.

They have some new tools available to use as they choose. And I think both of these technologies are the underpinnings for capturing what is essentially a people process, but making it more effective in terms of quality and making it more cost effective so we can do more with less dollars.

So I think there's some technology that certainly Defense is making a large investment in, and the DDR&E office is going to ensure that that continues because I think that is important. Industry is likewise making an investment in this kind of technology, so I think there's some new tools to bring to the fore in this endeavor.

Let me close with a quote from E.B. White who said, "I see a great future for complexity and, boy, we're in the middle of it." I do think that the main point that I've tried to convey is that in all this swirl of change, quite small in terms of dollars, just a few

percent of whatever enterprise you're talking about, is the R&D core. But its health is critical.

There are many changes going on affecting the form, the size and the investment strategy of the components of that enterprise.

And it's crucial to the country, and it is certainly crucial to national security that we do that in a reasonably smart way. But to a great extent, industry is going to make crucial decisions in how that goes. Thank you very much.

**"The Winds of Change"**

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Change: Technology,  
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Logistics in the 90's  
and Beyond**

## Question & Answer Session

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### Honorable Anita K. Jones

**GENERAL HATCH:** *Dr. Jones, it is a real pleasure to have you here. The first question is, should government and industry work together in developing plans for the future for engineering resources, or should we let the marketplace sort things out?*

**DR. JONES:** Well, let's see, I think actually I've already answered that because I've stressed how much is in the hands of industry, and I've tried to tell you along the lines of consolidation, diversification and maintaining technological security, what Defense can and is doing at this juncture.

**GENERAL HATCH:** *A personal question to you, Dr. Jones: how do you review and see your duties and responsibilities in your new position? Are there any changes in what the DDR&E will do or has done?*

**DR. JONES:** Yes. Because times have changed. And in times past, I think the DDR&E office has had as its first priority thinking about what are the key technologies. How do you make the science and technology investment?

And what policy guidance do you provide to set a vision for that? But what I talked to you about today is in fact the health of the performing organizations. And that is the number one issue for me today because the world is changing.

Because there are so many forces for change that are affecting what those performers look like. And that's a fairly major change.

**GENERAL HATCH:** *The next question is, do you believe that the laboratories should be consolidated under OSD control?*

**DR. JONES:** Let's see, I think there is no question that the laboratory infrastructure — and when I say "laboratories" I think large because I think there is great value in having laboratories which are a spectrum as I said

before — is defense infrastructure. And we have to downsize that infrastructure.

Right now we're going through what Secretary Aspin terms as a bottom-up review. And as I said earlier, infrastructure is one of the things being looked at. Laboratory infrastructure is included in that. I expect the results of that to come to closure and in fact to become public in this mid-summer kind of time frame.

I think there will be changes. Exactly what form they will take, I don't know yet. And so I'm not prepared to discuss that. It is too early at this time.

**GENERAL HATCH:** *Thank you, Dr. Jones. Another question: ARPA, the Advanced Research Projects Agency, reports to the DDR&E. How do you see the role of ARPA with the service laboratories in the future?*

**DR. JONES:** Well, let's see, ARPA and the service laboratories have cooperated along a number of dimensions in terms of projects, as some of you know, the activities that are described as thrusts. There are seven focused thrust activities which, by the way, will continue.

And ARPA and the services and the laboratories are involved in those. There are a number of other programs. ARPA routinely works through the laboratories because the laboratories have some elements, in fact, that ARPA does not. I expect that collaboration to continue. They routinely talk through the reliance process.

All the service laboratories as a whole are represented on the panels. ARPA participates in some of those panels where they actually have ongoing projects, and I just expect that to continue.

**GENERAL HATCH:** *On the subject of partnerships and consortia, what role do you see for international R&D cooperative efforts with our allies and the former Soviet Union?*

**DR. JONES:** Well, let me speak more generally first. I think there is always opportunity for collaboration internationally with allies. It's hard to orchestrate. It seems to move very slowly. In the general situation, I'm supportive of that. I would like to see what we're going to get back for what investment.

In terms of the former Soviet Union, there is technology of great interest out there, and there are a number of activities. It seems to be a very — as I say, I've been here six weeks — it seems to be very decentralized. We are interested in specific systems. We're interested in intelligence, and we're interested in technology.

In fact — and I have added a person to DDR&E to try to pull together the activities to look at the technology of interest and to catalyze some technical cooperation. Again, I want to make sure that we get a return for such investment.

**GENERAL HATCH:** *Thank you. The next question is a specific one. What incentives are there for a prime contractor to devote its design teams to advanced technology demonstrators to help research our technological edge if we're really not going to see these demonstrators result in major acquisition or modification programs?*

**DR. JONES:** Well, it's a direct question. Let me give you a direct answer. To a lesser extent now than in the past a demonstrator will lead to a production run. It has been an investment strategy for the defense industry to invest in an early demonstration and expect to get those dollars returned with dividends so you can reinvest in the next time around, to get those back in the production run.

And I think business has got to make savvy decisions about where to place its R&D investment. And that's going to be a set of hard investment decisions. I think quite straightforwardly there's going to be somewhat less of that and that Defense is going to have to pay for defense-unique demonstrations. Defense is going to have to foot more of that bill.

Where there are demonstrations that have been orchestrated in a form, that there is dual-use application not just way off on the horizon but clearly soon after the demonstrator, one can try to make the business case that that demonstrator is a good investment for industry because it will lead not just to possibly a production run, but to production that is of commercial import.

But it's going to be a very hard-headed industrial investment decision.

**GENERAL HATCH:** *Dr. Jones, this is an unclassified symposium, but the question focuses on special access programs and black world technology development. And the assumption is that those programs will continue. Would you like to comment on that?*

**DR. JONES:** Well, certainly special access programs will continue at that level. I think there is a slight change in culture. And let me give an example that's outside the procurement area.

As some of you know, there is an activity called the Gore/Gates Initiative in which the question is being asked, can you use intelligence assets for environmental science and technology exploration? This is quite unparalleled. A set of global climate change, environmental science folks, a small number have been cleared to learn about both the data and the capability of the sensors and to make some proposals.

And I think that is an anecdotal piece of evidence that says the question will be asked inside Defense of whether it would be smart to pursue what is now being pursued solely in the black world in a way that it has dual-use potential.

Now, a program can be kept in the black, and industry work at the R&D phase, and in fact there would be a clear vision of how the fruits of the technology exploration could at a later time be applied.

I wouldn't minimize the classification aspects here, but a number of the examples of how Defense is doing things today, in terms of dual-use, in terms of lessening restrictions on IR&D, there really is a culture in this administration that says, "Boy, it really is in our interest to integrate these two industrial bases."

And Defense needs to act in a way to

catalyze that. And this is another arena where I think at least the door is open to ask the questions.

**GENERAL HATCH:** *Dr. Jones, the Air Force Association is pleased to have you with*

*us today. We all wish you the very best in your new position, and we hope to see a lot more of you in the future. Thank you for being with us today.*

**DR. JONES:** Thank you.

**"The Winds of Change"**

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Change: Technology,  
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Logistics in the 90's  
and Beyond**

## "Acquisition Leadership in Changing Times"

Thank you, General Hatch. That's quite a title, Principal Deputy Assistant Secretary for Acquisition. It's taken me five years to get used to it. I appreciate the opportunity to be here today at the home of the Air Force acquisition professionals.

From a personal perspective, for a period of about ten years of my life in the Air Force, I've been involved in acquisition from an operational test to a requirements perspective.

And then more recently in the last five years as director of tactical programs, and then a little over three years in my current position. From that experience, it is clear in my mind that the acquisition professional of the United States Air Force today is "at war" every day while, generally speaking, the rest of the force is at peace.

Just as the warfighter must contend with the fog of war, so must the acquisition force contend with conflicting goals, conflicting advice and conflicting direction. Even when the program director obtains a clear understanding of what he needs to do, he suffers from the instability of resources, as the budget process continues to struggle with meeting its own conflicting goals.

And I understand the difficulties faced by all in the acquisition force, and I also understand the absolute need for military professionalism in that force. And in my opinion, as you look into that process, one of your conclusions, one of my conclusions, is that the Air Force requirement process is clearly the best in the business.

It's a very disciplined process, very consistent, and provides stability in an otherwise very unstable environment. The key to the success of that requirement process is the Air Force link between the warfighters and the developers, which is strong because of profes-

sional military operators finding common ground with professional military acquisition people.

And upon that common ground is built an entire infrastructure of our acquisition process which is equally strong and supported by both military and civilian professionals. And the Air Force is committed to support the military acquisition force, and we have long had an established career track. And we are currently, in my opinion, far ahead of any of the other services.

We now have a more formal career track that's supported by a DOD-wide Professional Education and Qualification System. Our top Air Force leadership also understands not only the difficulties we face, but it is also committed to support our acquisition force.

The Vice Chief recently spoke of the difficulties of dealing with our complex environment and of his concern that an acquisition can, in some cases, turn into an inquisition, and of his admiration for the work that many people in this audience do. But what I worry about is the proliferation of a no-risk attitude.

In my opinion, having been fairly broadly experienced in both operations and acquisition now, any job worth having, any responsibilities worth the name, carries with it some inherent risk. And Air Force acquisition people have a great reputation established over a long period of time for accepting responsibility and risk.

And as I mentioned before, acquisition people are "at war" all the time. Our "war-time" footing is underscored by the knowledge that by the time the systems we're working on are available to the operators, those roles may well be reversed.

We need people who are willing to accept risk, who want responsibility. People



who, as Teddy Roosevelt said, are "actually in the arena, . . . who strive valiantly; . . . who know the great enthusiasms, the great devotions, and spend themselves in a worthy cause." And certainly, acquisition within the Air Force and in the supporting industry is a worthy cause.

The new Under Secretary of Defense, Dr. John Deutch, recently testified to the Senate Armed Services Committee that the hallmarks of the acquisition professionals are mutual trust, willingness to take the initiatives to better manage programs without being overly concerned with perceived "risks," and forthright disclosure of programmatic problems when they arise.

So my challenge to the Air Force professionals that are here today is to stay in the arena, to meet adversity with responsibility and to lead others to do the same. Give them guidance. Give them advice and motivation to successfully manage whatever your subordinates are managing in support of your overall effort.

And above all, never, ever, ever cower in fear of failure. The products, the systems, the warfighting capability that you're working on, are essential to the United States Air Force.

Now, I'd like to talk a little bit about acquisition reform. Dr. Jones mentioned that, and I think there is an emerging general understanding of a new-found appreciation for the difficulty of managing programs within our current system of laws, regulations and rules.

As you know, the Department of Defense has established a new Office of Acquisition Reform reporting directly to the Under Secretary of Defense for Acquisition. And I would like to focus on that just for a few minutes.

You might ask, and rightly so, why we think reform would work at this time. It's certainly been tried numerous times in the past. And while I would certainly offer no firm predictions, I do believe it may work this time because I think it is well-understood that the time is right and there is a compelling need to change.

With our rapidly declining budget and our commitment to readiness, it seems to me

that business as usual in acquisition could in many cases lead to the end of business.

The Department of Defense, Congress, industry are not only concerned but are motivated to institute appropriate change. And Dr. Perry recently quoted Winston Churchill saying, "Americans will always do the right thing, after having exhausted all other alternatives."

I believe we may have exhausted about all other alternatives. And I believe that there is a general agreement and general consensus that the acquisition system dealing with the Department of Defense needs some help.

I see that for two reasons. First, the provisions of the existing laws and policies constitute barriers to acquisition. The Section 800 Panel that was commissioned by the 1991 Congress found 889 laws related to acquisition.

They specifically identified some 300 of those laws that needed to be changed, and they labeled these laws as barriers to innovation. They also tied that to a tremendous waste of resources, given those barriers and inhibitions within our system.

Second, bureaucracies are, by nature, risk averse. Certainly everybody understands that, and I don't think it's going to change. For one thing, the "reward" system for bureaucrats is tied to their ability to influence events in their functional area, not to the success of the project itself.

Secondly, there are multiple constituencies, and everyone has an equal say but certainly not an equal stake in the outcome. For example, we are currently spending effort on a directed infrared countermeasures systems for our J-Stars Program. This system is not supported by the J-Star's requirement documents.

Essentially, what I'm saying is that our warfighter has no requirement — J-Stars was merely the most available vehicle on which to hang the system that was championed by a special interest group.

And we in the Air Force, to get through the defense acquisition process, had to agree to invest in a separate technology program and put together a plan to look at cost and schedule impacts of incorporating this system in response to the special interest.

Obviously, we will do that. We will follow our orders. But hopefully, we can turn around and revisit that as we look forward to the future. But the combined effects of barriers to industry, and the nature of bureaucracies, are best illustrated by an incident which occurred during the Gulf War. The Army placed an emergency order for 6,000 commercial radio receivers, waiving all military requirements and specifications.

Because of the potential for second-guessing, once the urgency of the war had faded, no responsible government procurement official could be found who would waive the requirement for the company to certify that the Army was being offered the lowest available price.

And since the radio is sold in hundreds of locations, and any misstatement could constitute a felony under the law, no company official would make this certification. An impasse resulted. And this impasse was only resolved when the Japanese government bought the radios without price certification, donated them to the United States Army and put the purchase toward Japan's financial contribution to Operation Desert Storm.

In 1991, Congress, in my opinion, was very right to focus on the laws, and as the 800 Panel reported, the laws represent an apex of a cascading pyramid of restrictive regulations, specifications and practices which add somewhere between 30 and 50 percent to the cost of doing business with the Department of Defense.

But certainly a cultural change will be required as well. At our recent acquisition conference in Washington, one of the participants, one of the speakers, pointed out that despite the exhortations of top DoD officials on the use of commercial practices, there is very little implementation in the field.

He recently asked one field contracting officer what he perceived his job to be and that contracting officer responded: "To indemnify the US government to the best of my ability." And he added, "I understand that to whatever extent that I fail to do so, I may personally be held liable."

Clearly, in that program office, they are not going to forego the use of military specifications and terms and conditions anytime soon. So while reform, I think, will

move forward, it will certainly take time. And while we need the support of industry as well to change the defense acquisition system, like any huge ship, you never take your hands off the rudder. It requires continual fine-tuning before we'll see any significant change or any significant new direction.

In this day of declining budgets, our needs outstrip our dollars. And if we can win back part of that 30 to 50 percent I spoke of, it could potentially return to our programs and productive work, instead of funding such things as the 52 people that the 800 Panel found employed at a jet engine company solely to accommodate the government auditors' requests for reports, or the average eight times the number of administrative personnel which have been shown to be in military divisions of dual-use companies. The Air Force is committed to reform.

We have offered to help the Office of the Under Secretary of Defense for Acquisition. We are hoping to provide an Air Force Senior Executive Civilian to that office to work on the reform project.

We have in addition to that submitted several candidate programs, JPATS, JDAM, as candidate pilot acquisition programs, and there are several others being looked at at this point. These programs stand to benefit from the waivers to the existing laws and could take advantage of lower overhead costs associated with commercial standards. Some of you in industry have certainly helped us to identify the specific provisions in the law that most need to be waived.

And it's our hope that relief from the laws, regulations and rules will in fact help dual-use become a reality for certain sectors and certain elements of the American defense industry. Dual-use, along with reduced but stable procurement rates and increased emphasis on foreign military sales, should help us preserve the industrial base for the military and for the economic well-being of our nation.

We need to sustain and nurture our relationships with industry. New ideas and proposals proliferate daily. And in some cases they challenge us, in some they exhilarate us, and in some cases obviously they threaten us.

But we must maintain and build on the excellent government-industry relationships

we currently enjoy, and I think conferences and get-togethers, special conferences of senior executives like this, and other gatherings will be at the core of successful change. I see the development of a feeling of mutual trust and confidence and respect that flows from these kinds of get-togethers as we try and look forward to new approaches.

We're enthusiastic about the Aeronautical Systems Center's application of lean manufacturing techniques. The Aeronautical Systems Center is stepping out with a lean aircraft initiative with MIT to develop and implement road maps for change based on lessons from lean practices. With over 20 major contractors acting as sponsors and participants, we hope this three-year program will result in some of the same achievements the Japanese automobile industry has achieved.

Despite the things that change, many things will remain the same. While it is true our investment budget has dropped about \$16 billion since 1988, there is roughly about \$36 billion remaining in those accounts. And as I mentioned before, Air Force requirements are grounded on thorough warfighter needs and thorough analysis to support them. Those programs that have a strong critical requirement will continue to enjoy full Air Force support. The message is, the Air Force cannot afford those programs that do not have a strong users' requirement to support them.

Some programs can be considered core to Air Force in the future as it supports global reach and global power, and I'd like to briefly just mention a few of them.

The F-22, of course, remains the heart of our modernization efforts. Air superiority is critical to the success of our other aerial missions, and in our perception, the F-22 will allow us to survive not only the most sophisticated surface-to-air defense systems but will allow us to dominate in any air-to-air arena over enemy territory.

We are very pleased with the progress of this program, and we are currently right in the middle of a most critical design phase. We just completed a very fruitful CEO review. And the program remains at this point very well supported in Congress and also within OSD. We intend to take full advantage of the inherent air-to-ground capability of that aircraft as

well.

We believe the bottom-up review will support the F-22 to include its inherent air-to-ground capability as a key component of the resulting force structure coming up from that review. And once air superiority is achieved, this air-to-ground capability would enable us to employ the airplane in roles other than just straight air superiority on an as-required basis. We are pursuing that with some vigor.

We continue to have great success with the AMRAAM missile, which is, as I think you all know, the primary armament for the F-22. And while the program has had some difficulties in the past, I think we have overcome those and the missile now is considered by all, to include members of Congress and the committees, as a real success story and one that everyone is really very proud of.

We have accepted about 2,500 missiles to date, and it has been proven in combat with two successful engagements in Southwest Asia. It's proven the benefits of both long-term relations with our prime contractors and also the benefit of competition. The last buy of missiles was for about 26 percent less cost than previous years, and reliability is up dramatically — over 1,000 hours mean time between maintenance in our Southwest Asia operations. We will continue to support this missile with stable procurement, P3I improvements and support of foreign military sales for this missile.

Guaranteed long-range power projection is the exclusive capability of our aerospace forces, and we are committed to having a solid conventional bomber force. We'll continue a balanced program of B-52 sustainment, B-1 upgrades and B-2 procurements to fill out the 20 aircraft fleet.

We are on track on a three-phased approach with B-1 upgrades concentrating on conventional weapons and improving survivability. The B-1 will become the workhorse of the fleet and be able to attack all but the most heavily defended targets.

For those, we will use the unique stealth and weapons capability of the B-2. The B-2 flight testing is going exceptionally well. We have cleared the entire aircraft flight envelope, and we have recently demonstrated safe

and satisfactory release of both nuclear and conventional weapons.

We have also demonstrated superb integration of the critical navigation and radar systems, and we intend to deliver our first B-2 to Air Combat Command this December. In addition to that, with regards to the B-2, we are pursuing the earliest possible precision weapon capability for that platform.

One of the approaches that we are proceeding on is a B-2 specific solution using its synthetic aperture radar for targeting, coupling that with some limited number of GPS-aided munitions. We are pursuing that now on a near-term option, and we are seeking Congressional approval and support, funding support for that concept. However, the biggest challenge before us today on the B-2 is getting our responses to the 28 separate technical and business "hooks" through the Department of Defense in the form of SecDef certifications to Congress.

These technical and business hooks have developed over a period of years, and our funding is totally inhibited due to having to meet the needs of these 28 hooks. This will represent the culmination of a massive three-year effort which responds to restrictions on almost every aspect of B-2 funding.

This is certainly the most intense effort of this type on any program in recent history. The completion of these certifications is in fact vital to the entire future of the B-2 program. So we're working that very hard.

An important part of our weapons capability of our future bomber and fighter forces will be the Joint Direct Attack Munition or JDAM.

This INS/GPS guidance kit for our inventory general purpose bombs will give us for the first time a near-precision capability without the weather and vulnerability limitations of target illumination or the expense of a sophisticated internal guidance system. We just completed a very successful operational demonstration of this concept with some special hand-built INS/GPS kits to do that, and we had superb success ranging from two meters to 33 meters. As a result of that, and the low level of the technology involved, we are confident that we can build this highly accurate weapon in large quantities at costs

that we will be able to afford.

And while the bombers provide the nation with a robust quick-reaction capability, we're going to have to get ourselves and elements of the Army to the theater for sustained operations. As you all know, analysis after analysis, study after study has clearly shown the C-17 to be the aircraft for the job. And we are committed to fielding this world-class aircraft.

During testing, we have already established 14 payload to altitude world records, and General McPeak personally put the rubber on the ramp when he delivered the first operational aircraft to Charleston, S.C., the 14th of June. Air Mobility Command is now flying that airplane and doing some training with it. As many of you know, we're currently awaiting the results of the C-17 Defense Science Board Study which is due any day now.

It will weigh heavily in the outcome of the next Defense Acquisition Board scheduled for the 27th of August. Talk about challenges. This will be the third C-17 DAB since 1 January, 1993.

One of the stellar performers in acquisition today has been Joint Stars. Here's a system which, as you know, was abruptly pulled out of development to support Desert Storm.

And through the persistent and first class efforts of not only Air Force but also numerous contractor personnel, it performed magnificently. In May we received a favorable initial production decision. And last month we successfully completed the system level performance tests. Secretary Aspin recently went on record at a public speaking engagement and committed to fielding 19 operational J-Stars platforms.

Finally, as we move from a bipolar world to one in which the threat of regional conflicts predominates, and even third world nations have access to ballistic missiles and weapons of mass destruction, accurate and timely warning and assessment of missile attacks becomes a mandatory capability for the United States.

The DSP system performed beyond all expectations in the Gulf War, but as we look forward to our future needs, it simply cannot meet those requirements. And that is why we are working so hard on following up on the

Follow-on Early Warning System, which will provide earlier, more accurate detection, greater coverage and much more flexible communications to execute the warning.

This is a top priority program for U.S. Space Command. We are about halfway through a demonstration/validation program and are on track and committed to the selection of a single contractor for the engineering, manufacturing and development phase in the fall of 1994.

These programs that I mentioned, certainly there are many others, are crucial to the future of the Air Force.

Each of them has had or will have its share of challenges and difficulties as we go forward. But I have great faith that each program will contribute at some time to the future success of the United States Air Force. As many of you know, I will be leaving the Air Force this summer after 33 years of service. I am intensely proud of my service and all my experiences in the Air Force. I am also very proud of the Air Force which I have watched grow from hardly any training at all, very robotic canned training, to the great Red Flags and Green Flags that we have today — and also from a force that when I first came on active duty included F-86's, C-119's, B-47's to one which is now equipped better than any other Air Force in the world, certainly with F-15, F-16, hopefully B-2, F-22 and continuing on to C-17.

As proud as I am of the progress made by the Air Force, I am especially and immensely proud of our recent work in the research, development, and acquisition business. Not only the government work, but also the work and the accomplishments — work and current accomplishments of the industry as well.

I think that continued modernization of our Air Force is absolutely essential to maintain America's standing in the world. We must not succumb to the temptation to set aside our modernization efforts during this time of declining budgets, because if we allow ourselves to slip below the level of reasonable investments, we will truly be behind the power curve.

Many of you, like me, remember when we didn't have engines that could kind of dig you out of any problem you had. That's a very difficult recovery. We now have a catchy phrase for the loss of readiness. It's called a hollow force.

And everyone is keen to ensure we don't return to those days. But I would argue that we could become well-trained and well-supplied, however with aging and technology-bankrupt equipment, and that may require a new phrase, the phrase of adequate force or passable force or perhaps respectable force.

I see that as a far cry from the Air Force vision statement which is Air Force people building the world's most respected air and space force. So in my view, that vision must remain our mission, and modernization is vital to our being able to carry out that mission. I urge each of you, military, civilian and industry alike, to continue to reach out and seek responsibility to manage the risks and teach and lead others.

Continue the excellence which has been the hallmark of Air Force acquisition so that your place, to continue Theodore Roosevelt's admonition with which I began the speech, "shall never be with those cold and timid souls who know neither victory nor defeat." Thank you very much.

## Question & Answer Session

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### Lt General John E. Jaquish

**GENERAL HATCH:** *Really an excellent presentation, John. These questions are a small follow-up to a speech that came right from the heart.*

*You did a good job of answering many of the questions in the latter part of your remarks, but I didn't think I heard you talk about JPATS. We have a lot of interest in the audience on the pace of that program and where we're headed.*

**GENERAL JAQUISH:** As you know, we had a DAB on JPATS after a year's struggle this past June. The Air Force believes that we have met and satisfied all the requirements coming out of the Defense Acquisition Board.

The next event to take place will be another release of the draft RFP. We are working with the OSD staff now. We believe we have met each and every one of those steps. And I'm kind of an optimistic guy, and I would tell you I think that that thing will be out on the street here within the next five to seven days. And we will proceed on down the path, proceed to a final RFP sometime in the future.

**GENERAL HATCH:** *Thank you, General Jaquish. The next question is about C4I and also notes that there has been a lot of turmoil in that process, particularly with the change in management at the OSD level. What is your perspective on how that will proceed in the course of the next year?*

**GENERAL JAQUISH:** Well, I would just say that with all the confusion that exists in the acquisition business, in the procurement business, C4I at this point is very turbulent and very misunderstood.

As you know, there was the intent under the past administration to have a central DoD agency to do a lot of the centralized acquisi-

tion in support of command and control, and certain elements, having to do more directly with the warfighter, would stay with the services. That has subsequently been reversed. However, there are some conflicting stories out and guidance as to who is going to do what to whom.

One that I am personally aware of, the JLSC was an organization that was designed to pull together the multitude of requirements across the services and articulate those in a way that the responding program office could go off and procure the right system.

There's recent guidance out that would seem to indicate that there are people that believe that the JLSC ought to be the acquisition agent. And as a result, we in the Air Force, in the cases of the programs that we are executing, find ourselves in a situation where we are having difficulty executing the kinds of things that you would do in support of these programs.

And we are getting very explicit guidance from JLSC. I think this will be resolved shortly. I know the Air Force and, I think, the Army and the Navy are coming forward to go to the new OSD C3I and get that resolved. And I think the common view is, if you want the services to execute the programs and control the program offices, then they ought to have the normal line of authority and resources flow to them to execute that.

If you want some other organizations, JLSC or anything else, to work that acquisition problem, then they ought to control the resources. I think we'll get that sorted out in the next month or two.

**GENERAL HATCH:** *Thank you. Another question talks about appointments. You've been holding down two jobs now for some time. We do have a new Secretary of the*

*Air Force recently nominated. What about the Assistant Secretary level?*

**GENERAL JAQUISH:** I could be wrong, but I believe that Dr. Widnall has been identified as intended to be nominated. In the form of a formal nomination, it has not taken place yet. I really don't know what to say. I think you know the Senate goes out on break around the 6th of August and doesn't come back until after Labor Day.

I personally don't think we're going to see a confirmed Air Force Secretary at the earliest until the end of September. And it may even flop over into October. And I just have no idea on the Acquisition Executive.

I think they have identified the individual that they intend to nominate for the Air Force, but by the time we get to it, that process could take some time, October, November or perhaps even December.

**GENERAL HATCH:** *A question about Congress, General Jaquish. A number of these questions note that we have an adversarial attitude that we consistently see in print and in discussions about acquisition programs, contractors, services, and micro-management at the Congressional level.*

*What kind of advice would you offer on how to break down those barriers and continue to build a better relationship?*

**GENERAL JAQUISH:** Well, I guess I would say that certainly some of what you referred to exists. I think it's overblown to a large extent. You know, the headlines grab all those spectacular things, or something that somebody thinks is spectacular. On a practical matter, working with congressional staff and working with committees is done in a very straightforward way from my perspective.

And I've had the benefit of providing testimony over there to four committees for the last three years. And with rare exception, they are open and honest exchanges of information. But of course there are a lot of special interest groups. A lot of you in this room represent special interest groups because you're concerned about your business and so forth.

I don't think there's an easy solution. I think that we need to develop some mutual trust. And I think that we are carrying so much historic baggage. When you look at the 889

laws, the DFARS and all the acquisition regulations and restrictions that are there, each one of those by and large is tied back to some singular event that somebody decided, having had that event, "I'm going to preclude ever having that event again because I'm going to go out and write a law or I'm going to go out and write a federal acquisition regulation."

But I think this notion of animosity in the community, I believe, is well overblown. And it's overblown by the press. I'm not faulting the press. That's their job, to go out and look for stories that grab headlines. And that's, I think, what happened.

**GENERAL HATCH:** *A question about internal management. It has to do with the sharing in responsibilities between the program director and the new PEO concept that's been in place for a few short years. How do you grade the way we do business now? Do you see any changes ahead?*

**GENERAL JAQUISH:** I don't see anything, when you talk about acquisition reform, that ought to tamper with the basic structure. I think in some cases the system kind of gets clogged up, and it's very slow to react.

My personal view is that there are certain programs under the PEO [Program Executive Officer] and there are certain programs under the acquisition commanders at our product centers, and at our Air Logistics Centers. I think that system is working exceptionally well. I wouldn't personally recommend any changes to that.

And I really don't see any conflict in lines of authority. In other words, before we created PEOs, the SPO directors, the leaders of the SPOs, they worked for somebody. They worked for product center commanders, and of course in those days for the Systems Command commander and that sort of thing. And they were getting help and guidance as they went forward. So I don't see any real problem. I think that it has really worked well.

The Air Force really labored in the decision as to where should the PEOs be. Do you put them out in the community where they're out there so they can touch and feel the day-to-day activities in their support and portfolio or should they be in Washington D.C.? And General Yates here was a key player in that. And my view is we were absolutely right to

place the PEOs in Washington D.C.

It causes them a lot of travel and a lot of moving around, but I would also comment by saying, I don't care how long you've been in acquisition. If you haven't had a tour in the Pentagon, particularly at the senior level, you've only seen one particular slice of it. And I think it's been very beneficial.

**GENERAL HATCH:** *A follow-up question, how does the Air Force plan to keep the warfighters and operators involved at the requirements end of the process?*

**GENERAL JAQUISH:** Well, as I said before, and I believe this very firmly, the Air Force clearly has the most solid approach to requirements for our programs. And I think that is one of the strengths and why we develop such world class weapons systems.

And I would agree that it's not all perfect. There are things we can improve. There are some people who have a notion that as long as the military warfighter can write the requirements and be around to catch it on the other end when he does the operational tests, that everything is going to work out okay, that you just kind of throw this thing over the transom and that what comes back in ten, fifteen, some cases 20 years is just going to be right. That is absolutely not the case, and I think if you go around to the using commands who are the requirements articulators in the Air Force and ask them, I think you would find out that the acquisition community at all levels is coming to them on a day-to-day basis asking for their opinion, their judgment, what they really want to do.

Because, as we all know, there are literally thousands of decisions that are made somewhere between the articulation of the requirement and the operational test. So I think that is getting nothing but stronger, and in fact other services are starting to look at how we have done that within the Air Force simply because their view is that we are much more connected between the developer and warfighter.

So I don't think that's going to be a problem. In fact, in my mind every day we are going to the Air Combat Commands, the Space Commands, Air Training Commands and so forth and so on, Mobility Command, and asking for more participation in the deci-

sion-making process as we proceed.

And they are developing very expert staffs, some of whom end up in the Pentagon. Some of them escaped that torture. But I see that as a real strength.

**GENERAL HATCH:** *Thank you. The final question asks you to comment on joint Air Force and Navy work on the future fighter program.*

**GENERAL JAQUISH:** The truth is — and I think there's real evidence to support this — for various and sundry reasons, the level of cooperation among the services on joint programs is a far sight better than it had been in the past.

And some would argue that that's simply because money is scarce and we are getting driven together. And as soon as we ever get our pockets full again, we're going to separate. I don't believe that's true. I think that has contributed to it.

But I really believe that there are some fundamental understandings now between, for example, the Navy and the Air Force when it comes to munitions. We're strongly involved in it together jointly on a P3I effort for AMRAAM. We're united together on a next generation AIM-9 missile labeled the AIM-9X. They are with us on JDAM. With regard to future aircraft, I think, until we see the results coming out of the bottom-up review as to what is going to be the agenda, it would be inappropriate to talk about any specific airplane because if you do one thing, we would have some interest in a particular airplane. If the bottom-up review came to something else, it would be a little different.

I sensed that in the work that we have done with the Navy on the AX, for example, our chief and the CNO of the Navy sat down together on a quarterly basis, talked about requirements, talked about status. And they personally signed the requirements document, and a lot of attention was paid to that.

The Air Force put some very confident people in NAVAIR and they worked that out. Air Combat Command was energized in that requirements process, and we ended up with a common requirements document. No unique requirements for the Air Force. That was satisfactory to the Air Force.

So I think it's very possible, and I think



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Change: Technology,  
Acquisition, and  
Logistics in the 90's  
and Beyond**

depending upon what our needs are for different airplanes, I think you will see that continue. And I'm very optimistic that it will. That doesn't mean that all of a sudden the Navy is going to start buying the F-16 and we're going to start buying F-18s, but I think as we look forward to new developments there

will be great interest in that.

**GENERAL HATCH:** *Thank you, General Jaquish. Thank you for being with us today, and we appreciate everything you've done. The Air Force Association will have another opportunity down the road to be a little more formal with that.*

## "An Overview of Science & Technology"

Thank you, General Hatch. We're delighted to be here and talk to you. I'd like to give you this morning a snapshot of where the Air Force Science and Technology Enterprise is, a little bit of preparation for today's panel, and also to try and give you an idea of where we're going, if I could.

Chart 1 please.

### Overview

- ❖ Air Force Science & Technology
- ❖ Air Force Laboratories
- ❖ S&T Reliance
- ❖ Defense Conversion
- ❖ Summary

Chart 1

I'll give you a little bit about how we're trying to manage the resources we have, a quick description of the laboratories, and their present state and how we're working with the other services, and then a little bit of what we see as where we are headed.

Chart 2 please.

### AFMC Mission

Through integrated management of research, development, test, acquisition, and support, we advance and use technology to acquire and sustain superior systems in partnership with our customers. We perform continuous product and process improvement throughout the life cycle. As an integral part of the Air Force war fighting team, we contribute to affordable combat superiority, readiness and sustainability.

Chart 2

Science and technology is the core of the AFMC mission, and you can see that part of that mission statement. The advance and use of technology is essential to how AFMC does its job. Chart 3 please.

### Air Force Science & Technology

- ❖ AF labs reorganized in four interdisciplinary labs
  - ◆ Technology programs organized in 12 technical areas
- ❖ Research centrally managed by AFOSR
- ❖ Strong tie to the users
- ❖ External evaluations of laboratory programs

Chart 3

64 **Opportunity and Change: Technology, Acquisition, and Logistics in the 90's and Beyond**

Now, what have we done over the past three years? What has changed? First is we have reorganized the laboratory structure into four interdisciplinary labs. Within that structure we run the technology program in 12 distinct areas, and I'll come back to that again.

Research, we handle centrally out of Bolling AFB, out of AFOSR [Air Force Office of Scientific Research], the manager for 6.1 in the Air Force. We have put a lot of effort into developing ties with the other services, building joint plans, and strengthening those links with Army, Navy and with ARPA, the other defense agencies.

Now, one of the activities we are working very hard on is linking our technology structure to the civil technology structure. The labs don't rate their programs. Our laboratory programs are rated externally. First, the quality of those programs is assessed annually by the Air Force Scientific Advisory Board that reports to the SAE [Service Acquisition Executive] and reports those results to the SAE, but those are also the basis of command metrics on the quality of the science and technology review.

On the relevant side, the customers that use that technology rate it, the development planners that look at our Tech/Base activities, at the core laboratories activities, and decide how it fits to their concepts, their system concepts of the future.

And also we have means of tying to the

infrastructure. The end products of laboratories are scored by the users. And we take those scores very seriously. So those items, those programs that are the end of the S&T cycle are evaluated by the MAJCOM [Major Command] users, and the rankings of those determine whether or not the programs are to continue, whether they're started and whether they will continue.

Chart 4 please.

What resources do we bring to the table? In basic, the total program is about 2.4 billion. About a tenth of that is basic research money, as I say, handled out of AFOSR.

At the 6.2 level, it's 600 million. There's half a billion dollars in advanced development, and half goes to the so-called ATTDs [Advanced Technology Transition Demonstrations]. Then the last line up there is a very important line to us. That is the money that is brought to us by other customers who want to use the Air Force S&T enterprise to carry out their work.

A lot of that is BMD [Ballistic Missile Defense] money, DNA [Defense Nuclear Agency], ARPA [Advanced Research Projects Agency]. But it extends over a host of sources. And we consider that a very important element to our funds, that billion dollars of other non-Air Force S&T money that comes to the laboratory system.

The people that do the work number about 3,500. There are about 4,200 scientists and engineers in the structure, about 800 at the doctoral level, a number incidentally that we are working very hard to increase because we consider the quality of our workforce a highly important item.

We are doing that at the same time that we are downsizing our force. I will tell you that's a very demanding task under the Civil Service system. But nonetheless it is one that we take seriously and we are working very hard to do.

And there are about 3,000 support personnel that support those scientists and engineers in the laboratories. Now, what do we do with the money we have? One of the issues that you've heard discussed this morning has to do with what Dr. Jones relates to the issue of infrastructure.

That's what the bottom of that chart speaks to. But the Air Force has always been

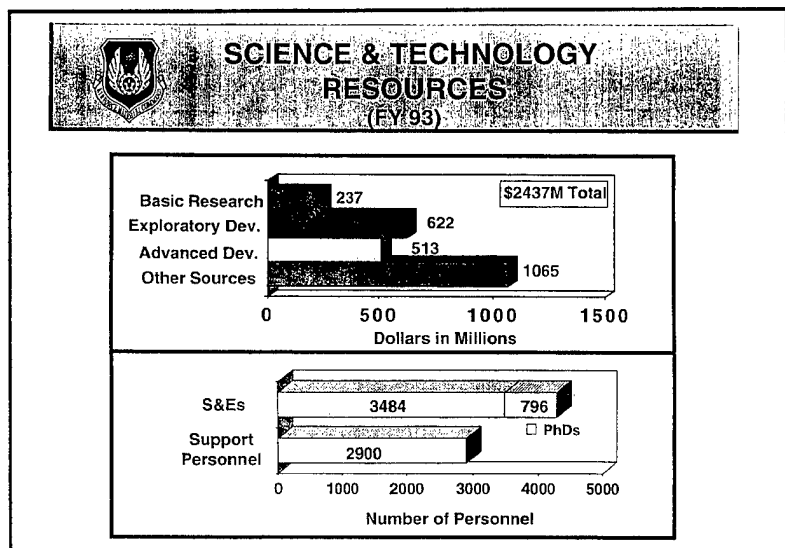


Chart 4

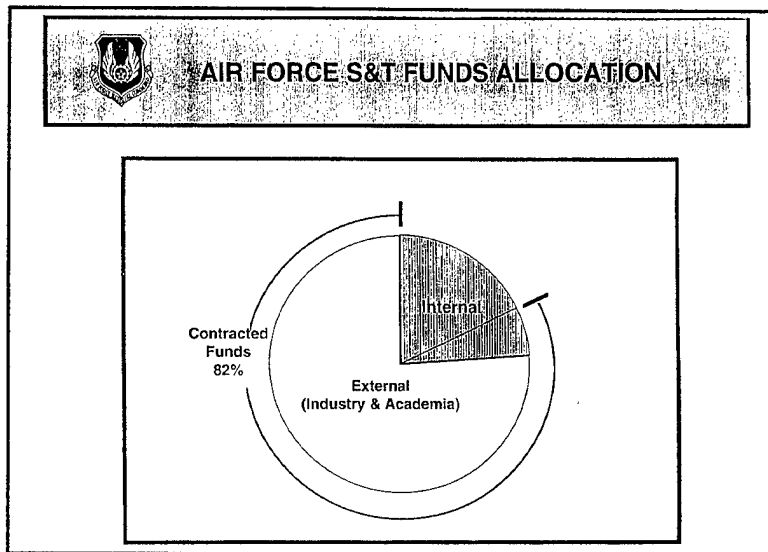


Chart 5

in partnership with industry and academia, and that is more so today.

Could I have Chart 5 please?

We use those funds primarily externally to fund research and development, research primarily in the university community and development in the industrial community.

Three quarters of that money goes external on contracts and grants and will in the future go under some of the new agreements that are coming up. Of the internal funds, a portion of that also goes out on contract to support work which is done on base within the R&D structure that we bring.

That will bring the total up to over 80 percent of our funds that go external. Another item that was discussed this morning is the level funding aspect of the S&T enterprise, and the next chart will give you an idea of that.

Chart 6 please.

Over the past 10 years — and this is measured in real dollars — there has been a significant decline to our funding. But I guess in the present climate we should be grateful for what we have enjoyed in terms of stable resources.

You know, incidentally, that research, the 6.1 at the bottom line, is essentially stable. The 6.2 has declined, but not too badly. And 6.3A has taken a fair hit — or unfair hit, depending on whether you received it or not.

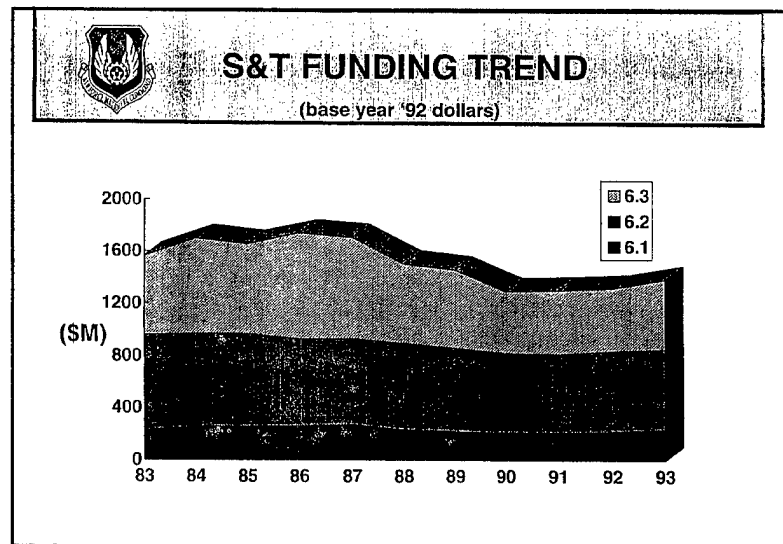


Chart 6

So that is the resource picture of the laboratories. I told you earlier that we manage by 12 technology areas. Those technology areas are out in the laboratories.

The technology areas follow: Wright Laboratory is responsible for aero propulsion and power, air vehicles, avionics, materials, and conventional armament; Phillips Laboratory is responsible for advanced weapons, geophysics, and space and missiles; Rome Laboratory is responsible for C3I; Armstrong Laboratory is responsible for human systems and civil engineering and environmental qual-

ity; and the AF Office of Scientific Research is responsible for research sciences.

From our perspective, we look to the plans that we complete each year in those. Those are the plans that go to the service acquisition executive as the portfolio for General Paul, the Technology Executive Officer for S&T.

The first block of programs belongs to the Wright Laboratory which is here at Wright-Patterson AFB. It is our air vehicles laboratory.

The technologies associated with that range from propulsion systems, flight control, avionics, materials, (a corporate enterprise activity for the entire force), and weaponry for aircraft. They are executed by the Wright Laboratory here, the largest of our laboratories.

The second group constitutes programs of the Phillips Laboratory for space and missile systems. Those activities, directed energy, advanced weaponry, environment — space as well as earth environment — and the hardware and systems for space and missiles are executed through Phillips Laboratory at Kirtland AFB in New Mexico.

The C3I programs, Command Control and Communications and Intelligence, hardware and software, are done at Rome Laboratory, located at Griffiss AFB, N.Y. And those programs in the human systems are carried out at Brooks AFB, Texas, which is part of the Human Systems Center.

Also Armstrong Laboratory now has the charter for our environmental quality activity, of the technologies associated with environmental quality, as well as air base operations technology and civil engineering.

The last area is the 6.1 Program at Bolling Air Force Base.

Here at Wright-Patterson the complex includes a wide range of facilities from avionics, materials to flight control, several other test facilities, the ability to test the full aircraft structurally. It's the major complex for air vehicles in the nation.

Phillips Laboratory is located at Kirtland, but it also has major facilities at Edwards Air Force Base where we have traditionally done our rocket propulsion activities.

The Rome Laboratory is the C3I center.

As you know, Griffiss Air Force Base, where it is located, is an ACC base on the realignment list. That is going to present us with a major challenge. The B-52s will be gone from this base and with it all the military elements that were key to the support of this activity.

So we will now have the challenge of sustaining this laboratory at Griffiss Air Force Base. That is our intention.

At Brooks Air Force Base, the major complex is in human systems. The Human Systems Center headquarters is surrounded by the laboratory and the School of Aerospace Medicine, along with the other laboratory facilities associated with that center at Brooks.

Let me change subjects now from geography to how we are working with the other services, because that's a major issue in today's times. Chart 7 please.

We cannot afford not to work with the other services. But we also have to have a

### **S&T Reliance**

- ❖ A service-led process to interrelate Defense S&T activities
  - ◆ Reduce redundancy and overlap
- ❖ A procedure for joint program planning
  - ◆ Gain productivity and efficiency through collocations and consolidations where appropriate
- ❖ A means to preserve the vital mission-essential capabilities of the services

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#### **Chart 7**

proactive stance in that arena.

We take that quite seriously. And the services have done so with the project called Reliance. There are two parts to Reliance. One is the science and technology part, and the other is test and evaluations.

But the activity is to interrelate defense activities in these areas of science and technology and also in tests, looking toward reducing any redundancies and overlap. But from our perspective, it is also to build critical masses in areas that are important to us and moving out of those specialty areas where we no longer maintain the core competencies to carry out the work.

We have joint plans. It's a process by which we do joint cross service planning. Those things constitute literally books in each of the technology areas. Reliance allows us to maintain, through our service laboratory structure, those key links to the warfighters in our services that I believe are absolutely essential for the right kind of technology development.

We usually talk about Reliance as though it is the joint directors of laboratories — Air Force, Army, Navy, DNA, BMDO. That tends to be the physical science bunch.

There are behind them — or with them — three other groups. First is the Armed Services Biomedical Research, Evaluation and Management Committee, which concerns itself with the biomedical research area. ASBREM, in fact, was the genesis of this kind of interservice activity. It is a dozen years old, generated by congressional concern some time ago.

There is also the Training Personnel Systems Science & Technology Evaluation and Management Committee for training and personnel systems. And in the area of civil engineering and environmental issues, there are the joint engineers.

Where are we? We have completed joint planning in science and technology for all 31 technology areas.

We have created a series of joint programs. We now have actually collocated resources for 11 major programs, and we will be looking to more of that as time passes.

We have in the Air Force essentially gotten out of gun work, but we have people at Picatinny Arsenal now because Army is the lead in that activity. Toxicology is done here. The other services are participating in the Armstrong Laboratory, joint activities in toxicology.

At Brooks we're the lead in EM hazard R&D, the directed energy hazards to humans,

and the other services have located their people with us there. And there are a number of other examples where we are doing the same. We are working this right now for fuels and lubes across the services.

And Army people are coming to Wright-Patterson for that kind of activity. We have also tied this into the OSD thrust; and in fact, we look today to participation quite directly with DDR&E in terms of Reliance leadership where this activity is going to go in the future.

Now, let me tell you a little bit about what our perspective is towards defense conversion.

That rubric covers a number of activities, and I'd like to just speak a bit about them from the laboratories' perspective.

Historically, of course, this has been going on for some time. Congress has promoted this activity since the 1980s, when it required laboratories, under the Stevenson-Wydler Act of 1980, to establish offices of research and technology applications. That was subsequently extended to all R&D organizations and was a mandate.

And later the Technology Transfer Act of 1986 set as a requirement for the R&D work force to work with industry to transfer technology to the civil sector. That act also established CRDAs [Cooperative Research and Development Agreements] that got off to a slow start until that activity was promoted much harder.

In 1992, Congress added the reinvestment and transition assistance clauses under the Defense Conversion Reinvestment, and Transition Assistance Act. That activity put one and a half billion dollars in ARPA to carry that work out.

The President's initiative, "Technology for America's Economic Growth," defined the goal of refocusing American technology to build economic strength and spur economic growth, which in effect added economic security as one of the pillars of the Defense Department mission. And it defined how the new administration expects this work to be carried out.

The primary mechanism defined for DoD is cost-shared R&D partnerships with industry and for Federal support to support that commercial R&D.

There was a strong emphasis on reorienting the DoD as well as the NASA and DoE [Department of Energy] R&D enterprises toward building a single tech base, and that idea is key to the notion that there would be a single tech base from which we would apply technologies for both commercial and military use.

The specific proposals include shifting more R&D from defense to commercial activity, from a 60/40 ratio of defense to commercial in 1993 to a 50/50 ratio in 1998, a \$9 billion shift; encouraging federal labs to devote 10-20 percent of their budgets to R&D partnerships with industry; and requiring agen-

### **Defense Conversion**

- ❖ Dozens of examples—little publicity
- ❖ Multiple dimensions:
  - ◆ Use of unique government research/test facilities
  - ◆ Technical assistance (especially small/medium businesses)
  - ◆ Collaborative research
  - ◆ Commercialization of military-oriented technologies
- ❖ Renewed emphasis in AFMC
  - ◆ ORTAs at every product, test, and logistics center
  - ◆ Technology Transition Office
  - ◆ Strong involvement by AFMC/CC

*Chart 8*

cies to remove obstacles to cooperative agreements and to facilitate industry-lab cooperation.

We believe we have very large amounts of our R&D funds in partnership with industry. But he specifically spoke to the cooperative agreement kind of partnerships and instructed the agencies to look to removing barriers for those cooperative agreements, to address issues such as mil-standards and the extent to which they inhibited the use of commercial practices and to facilitate that industry/lab cooperation directly. That is in fact just where we are going.

Chart 8 please.

Now, in our system there are dozens of examples of where we have done this sort of activity. And it has many dimensions to it. We have many examples of government facilities under use today. You probably know that the center down in Oklahoma has a major agree-

### **Intelligent Tutoring Systems (ITS)**

- ❖ Uses AI-based systems to provide tailored training which dynamically adjusts to match student's proficiency level
- ❖ ITS developed by Armstrong Lab to train AF personnel
- ❖ Tailored to support educational training at junior
  - ◆ Mathematics/word problem solving
  - ◆ Reading/writing
  - ◆ Life sciences

*Chart 9*

ment with Pratt & Whitney and a second one with Boeing for the test of their commercial engine.

Those are experienced through the CRDAs. This command is taking this seri-

## Intelligent Tutoring Systems (ITS)

*CRDAs used to move ITS into public schools*

- ❖ Dayton OH
  - ◆ NCR provided 60 PCs and networking at 75% discount
  - ◆ Wright Lab provided \$375K grant
  - ◆ Two school locations
- ❖ San Antonio TX
  - ◆ University of TX provided 30 PCs & network at cost
  - ◆ Armstrong Lab (AL) provided 30 PCs
  - ◆ Three school locations + AL sponsors Allentown PA site
- ❖ Albuquerque NM
  - ◆ Phillips lab provided 60 PCs & network
  - ◆ SRI provided technical support
  - ◆ Two school locations
- ❖ Rome NY
  - ◆ School district provided all hardware
  - ◆ One school location

### Chart 10

ously. We now have offices in every product test and logistics center for technology transfer.

We have created a Technology Transition Office here in Dayton that serves as a

facilitator and is a single phone number, if you will, in order to assist businesses with reaching the appropriate part of the command. And the commander has taken a very serious role in this work, in promoting it.

Chart 9 please (see previous page).

Let me give you just a couple of examples.

I just want to give you a case out of the Armstrong Laboratory down in the human systems center.

Chart 10 please.

As you know, the Air Force is a major trainer of people in this country. And one of the things we look at in R&D is what is the best way to train people. And we have a lot of people that are inducted into the service, and we want them to do high-skill tasks such as engine maintenance.

That laboratory has devised a type of computer-based training. That is not a page-turner. At its core is an intelligent expert system, a system that knows the facts of how to do a job best.

Coupled to that is another computer system, and it's an artificial intelligence system that senses the cognition skills of the trainees. As the trainee responds to the computer, it determines where the weakness is of the student and then reprograms the training to address that skill, or lack of skill, of the individual.

Well, after the Armstrong Lab had devised that system, it occurred to them, what a great thing this would be for students in the public school system. In particular, though, students that aren't necessarily very well-motivated, and so they took that plan, that system, and they tailored it to the junior high level.

And they have created a set of modules to go with it in the area of math, word problem-solving, reading, and writing. And those modules we have now taken out to test, and they are operating now in five school systems. Four are shown on the chart.

At each of our laboratories, we have more or less put the task out. And you see here in the City of Dayton we have a cooperative activity where National Cash Register has provided 60 PC's. Wright Lab funded the activity, and we now have out in two school locations this



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kind of training going on.

Similarly, at the other locations, in San Antonio, an analogous process with the University of Texas and Armstrong Laboratories. And out at Albuquerque we have it in some public school systems, and also in Rome, New York, and in Allentown, Pennsylvania.

This system is now completing its test.

It's really pleasing to see how it has gone. We have gotten not just the question of some cold tests scores on how much better students are doing, but we have had unsolicited comments from the teachers telling us how much better motivated their students are and how they have recouped students they thought they had lost by putting them in this process.

And it's something that livens up the students' training and matches to their talent, and it does the job that a tutor does for a person, that a human tutor would do. So it's one of our success stories. It is not a done

story. It has several phases.

We are looking to move this out of our activity, once we do the testing, to the commercial world. But we see this as one of those links between the laboratory and the larger community that are key to what the President has asked the Federal R&D system to do.

Just to summarize for you, the science and technology enterprise is well. We are now working four inter-disciplinary laboratories with a single manager of research. Laboratories have to compete for the 6.1 money, incidentally.

We have tried to tie our program very hard to the users. And, in fact, the user has almost veto vote on some of the programs. We have now linked the program to the other services, and we are working hard to bring that technology out of the laboratory, to link to industry and to work for the betterment of the entire nation. Thank you very much.

## Question & Answer Session

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### Dr. Allan C. Schell

**GENERAL HATCH:** *Thank you, Dr. Schell. That was an excellent run-down. A number of questions here. You had 12 technical areas in one of your early charts. How does that relate to the DDR&E seven thrusts that Dr. Jones talked about earlier?*

**DR. SCHELL:** There is a mapping of that. Remember that those seven thrusts really are looking toward a wider scale application of technology issues, such as global communication, rather than the specific S&T technologies themselves.

This is how we manage the 12 areas that are Air Force centered technologies, but those have to be integrated into a given thrust such as global communication or precision strike, which represent applications of it. There are of course two major underlying threads to that work.

One is the affordability, which I think more than ever we are going to have to stress when we are carrying out technology. That is to say, we are going to have to look quite differently when asking for performance given the fact that we no longer — or in the immediate future — are not going to have those production runs that can “cure some of the affordability issues.” We are going to have to stress that element.

**GENERAL HATCH:** *Thank you, Dr. Schell. You also talked about the number of personnel in the laboratory systems, but you didn't comment on the military/civilian mix within those numbers, and there are some changes in that area. Can you comment please?*

**DR. SCHELL:** There certainly are. Laboratories are about 20 percent military, 80 percent civilian. That's about the ratio. It varies with the laboratory.

The Armstrong Laboratory at HSC,

there's a very strong military core to that activity because that relates directly to the medical side of the Air Force, and it also carries with it a lot of the educational side in the medical area.

Less so in Rome, New York, where I think the total military strength is on the order of 10 percent, higher than that, but not much.

**GENERAL HATCH:** *Thank you. This is a question about dual-use, but it is the other side of the question. If there's too much emphasis on dual-use, won't that ultimately dilute the focus of the dollars that you have from the unique military requirements.*

**DR. SCHELL:** Good question. Good question. It's something I didn't say straight to you. The mission of the laboratories is to address Air Force needs, and we continue. That's why on the front of the sign it says that.

So the mission statement carries addressing Air Force needs, but we see the linkage to commercial application as the modality by which we work. We will no longer simply go out and acquire what we want in technology.

We will learn to work with industry in a cooperative way so that, while we address military needs, we aid industry in its commercial interests.

That is going to require a new way of working in the laboratory, and it is going to have to be a cooperative relationship with industry. So that's going to be a burden on all of us.

We're going to have to learn how to do that and be supportive in this system rather than in an adversarial relationship. And the key then, as we look to those funding charts, since we do not have the funds to acquire all that we want, is going to be to work cooperatively with industry in the development of technology so that at a later time we can spin

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that work back to military use.

*GENERAL HATCH: Thank you. Another question, this one on funding. You referred to the drop in 6.3 funding, and when we listen to the strong emphasis from the Office of the Secretary of Defense on the Technology, Demonstration and Prototype Program, doesn't that mean that that funding will have to increase?*

**DR. SCHELL:** I believe that one of the

key issues for the DDR&E is to advocate the thrusts when speaking to Congress. So that as the need is there, particularly for 6.3 funds, we can, across the services, provide the kind of capabilities that are described in those thrusts.

*GENERAL HATCH: Thank you, Dr. Schell. We certainly appreciate your presentation and excellent run-down. Thank you for being with us here today.*

## Technology Panel:

**Dr. Gary L. Denman**  
**James J. Mattice**  
**Kelly C. Overman**

## Moderator:

**General Robert T. Marsh, USAF (Ret.)**

**GENERAL MARSH:** Thank you very much, Monroe. You know, it's a real pleasure for me to host this group and moderate these efforts. Let's start right down and hear first from Dr. Gary Denman, the Director of ARPA.

**DR. DENMAN:** I will keep this rather brief. I believe the last set of speakers all morning have given my talk. But let me just try to summarize and tell you a little bit about where I see the future focus of some of these activities.

I believe that we should focus on two challenges as we move forward. And there are enormous challenges as we move further into the post-Cold War era.

The first challenge is taking a fundamental attack on the cost issues with respect to military hardware, both new and upgraded systems in this declining budget environment and declining base environment. I believe that's an enormous challenge that we have a limited tool kit to attack today.

And I think the second enormous challenge is in that environment, as the industrial base goes through massive reshaping, being led by industry, to try to stimulate in that process the integration of the military and commercial base. I think those two challenges will keep us busy for some time to come.

And as previous speakers have said, I believe Secretary Aspin has set the stage for the role of the Department of Defense with respect to economic security which basically forms the basis for the dual-use technologies that of course ARPA is very deeply involved in.

Those fundamental questions are there. How do we modernize our forces in a reduced budget environment? How do we do that in a cost-effective, affordable fashion? And how do we stimulate an industrial base that not

only can be responsive to those defense needs, but also can provide for and move forward with respect to economic growth in the U.S.?

I do believe that this coupling to defense of the economic security question creates, definitely creates a win/win situation for us in the sense of leading to a more affordable defense through living off of the commercial base to a much larger degree. And at the same time, the defense investments have a more direct impact on economic growth.

I think as we look at this clearly, acquisition policies are going to drive many of the solutions to these questions I have raised. However, I also believe that technology can be a path-finder and in fact can have a great deal to do with shaping the future. And that's what we're about in our programs, some of which you know by the title of the Technology Reinvestment Project and dual-use investments at ARPA and the services.

Let me say a few words about the civilian military integration and the industrial base. I believe it's not just a desirable thing to do. I believe it's an absolute imperative. And as you look at — particularly at the materiel component — the level of what goes into our systems, living from a unique defense base or unique defense requirements is absolutely not affordable as we move into the future.

We created this environment for many reasons. And it's a very complex set of questions, but I also believe that the new leadership of the DoD is absolutely committed to tackling this question. I think if you haven't, you should read some of the speeches that not only the secretary, but particularly that Bill Perry and John Deutch have been giving. It gives a great deal of insight as to their thinking about not only what needs to be done, but setting some goals and also defining some approaches

on how it can be done.

It clearly includes that broader view that national security is tied to economic security. I think this dual-use technology investment focus on the part of ARPA and the services — you just heard Dr. Schell speak to this — is absolutely a starter kit for this question of integrating the industrial commercial base.

And I believe it's a sound strategy and will lead us to some positive effects in the future. Let me just be very careful to define dual-use because I think at times in some writings and in some interpretations by the press there's a different twist put on it than I like to put on it.

I believe dual-use clearly means without question that we have a clear military need, and we must not lose sight of that. It is the second part that is fairly new, and that is searching for opportunities for creating technology for new commercial products and processes. And I believe we need to keep both a product and a process focus to this question.

I think there's also a clear message here for industry in the context that those industries today that are defense unique or defense dominated are going to clearly have the most difficulty in moving in this direction.

That is, I don't believe it's going to be a quick fix in any way, shape or form for these industries to suddenly become agile in other markets, particularly other commercial markets. And that will take time. Perhaps the fastest approach to that I see happening is all of the motion that's out there, with respect to partnering and dialogue between industries to partner in response to this Technology Reinvestment Program solicitation that's on the street, and we expect to receive a few proposals next Friday. I quit giving predictions of what that number might be. Let me just close quickly with some comments on ARPA and the '94 program as it has been submitted to Congress.

This TRP program has been proposed to continue with \$324 million in the President's budget for the TRP and directly related activities. There's also substantial increases in our budget in other dual-use technologies, things like flat panel displays, things like lithography for microelectronics, advanced materials activities, all of those which in the past have

been congressionally mandated programs and plussed-up programs that are now part of my budget base.

Between this TRP and the other dual-use programs, my budget is now in '94 about \$2.2 billion, which is obviously a very substantial sum that carries with it enormous responsibilities. There's a clear third part and very strong part of the ARPA program that has not been damaged by all this focus on dual-use technology, as some may think it has been damaged. But I don't believe it has. In fact, it's as strong as ever.

And that's the programs that are focused on developing and demonstrating military capability. I believe that is and will remain, and should always remain, the number one focus and mission as to why there's an ARPA. So I believe that is still sound. As we move to '94, I think all three segments of the ARPA program, that is the TRP type activities, other dual-use activities and military capabilities, are alive and well. And we look forward to working with industry as we move forward. Thank you.

**GENERAL MARSH:** Well, thank you very much, Gary. And now I'd like to introduce James Mattice, who is the Deputy Assistant Secretary of the Air Force for Research and Engineering. Jim?

**MR. MATTICE:** Thank you, General Marsh. I'm going to try to do three things this morning. First of all, just touch on some aspects of some things that have been talked about this morning and try to put a focus on them, if you will, in light of what I believe to be very extensive and fundamental change coming with respect to our science and technology institution, its resources and so forth, probably the most fundamental change over the next very few years that we will have seen since the formation of our laboratory and S&T program back in 1947.

Second, focus on some of the fundamental issues that I believe the new secretary and the Air Force leadership in general will have to deal with. And, in fact, the one chart I have is the last chart in a briefing we're putting together for our new secretary about to be appointed. That makes her Secretary Designee, I guess, Dr. Sheila Widnall.

And finally, leave the Air Force Associa-

tion with an appeal, if not a challenge, for assistance with some of the problems that we see confronting us. There's a little story I think is in order that kind of says what I would hope to say is one of the most important things.

Recently, out at Brigham Young University there was a competition held by the University, and they invited other universities to send some of their engineering students to build little submarines and have a competition to see if they couldn't put them in water — in a swimming pool — and have them stay on course, submerge, and just at the other end, surface. That was the competition, the ability to stay under water for the maximum time.

And this was all without anything other than a rubber band motor. And it turns out the Air Force Academy decided to send an entry to the competition. They worked very hard, went out there and they put their submarine in the water. And sure enough, just like many of the entries, about halfway down the pool, the submarine prematurely surfaced.

So there were several heats of this competition. So quickly the Air Force Academy engineering students got their little submarine, they went back, regrouped, dug into their pockets and found pennies and nickels and dimes to balance the nose of the submarine. They did a quick calculation and off they went to try again. But before they could even put the ship in the water, someone whispered rather loudly, "Isn't that like the Department of Defense, they run into a problem with a project and they begin to throw money at it."

Well, I think the academy cadets thought they were being creative and innovative, reacting on the spot to a technological challenge, yet the perception even of people watching with interest was clearly different. I think we have a major perceptual problem in the very near term.

And I'll be very specific on some aspects of it because I appeal to you in these forums to help set the record straight and to convey accurate information about what is, so that what we might see become is at least based upon accurate and reliable information when it comes to changing our present institution.

[Mr. Mattice showed a chart of some issues that will be brought to the attention of

the new Air Force Secretary.]

Trying to deal with other elements of the Air Force leadership, we've discovered, kind of as a result of really thinking we're doing a great job making the Air Force Technology Program relevant, interacting with our stakeholders, the users and the industry and academia, that over the last year or two we forgot a little bit about the real owners, which are the Air Force leadership.

We had a strong partner in Don Rice, the prior secretary. We kind of forgot about the chief and the vice chief. We hadn't briefed them we discovered in well over a year — the four or five of us who feel responsibility for the stewardship of this \$2.4 billion total program that was displayed, which includes about \$1.5 billion of Air Force dedicated resources and nominally \$900 million that includes funding from ARPA as agent.

That's a significant resource, and we want our leadership to be the owners as well as our users, the operational users, and you, the public, and the interest groups. And particularly the Air Force Association constituency who is one of our major supporters.

The quality and relevance of Air Force science and technology has already been talked about. You will recall Dr. Jones said quality of the present execution infrastructure and the quality of the program is very high on her priorities. Frankly, that perception is really one of concern about quality as our OSD leadership looks across all of the services, and as the new leaders come into the building with perceptions and with conclusions based upon their interactions with the elements of the institution in the past. We work very hard on quality and relevance, have very specific metrics that Al [Schell] did not have time to show in detail.

That information statistically can be made available as to how we do that with the General Mike Lohs of the world [the ACC Commander] and with the Scientific Advisory Board which was alluded to. I think it is a story which I have not been able to find a credible equal to in the other services or in the federal laboratory bureaucracy across the board.

That's a story. And this gets to where I'm

kind of going to kind of challenge the AFA to help us tell that story in the forums outside where we are unable to reach, where you have capabilities through the AFA magazine, for example, and through other interactions. We need to give you that good stuff because there is a very good story there.

I think one of our strengths is how we relate and share ownership, vest ownership with our operational users. They will tell you how well or not well that is going. And our process there is one of continuous improvement. Similarly, for quality of science with the Scientific Advisory Board and other peer evaluations, the business of balance is vital, absolutely vital.

In more than one speech and in more than one closed room, senior members of the DoD technology establishment have been heard to say they really believe that there are on the order of 90,000 to 100,000 people in the defense service research establishment. That is totally untrue.

The reason for that misperception, quite candidly, is data that was provided to them which was more representative of the total acquisition infrastructure, S&T being seen as part of the acquisition process. We've been working very hard and are taking advantage of the opportunity to have kidnapped Dr. Jones this afternoon out at Wright Laboratory and Armstrong Laboratory here at Wright Field to try to bring into focus the difference between our investments and personnel in science and technology and the total acquisition infrastructure, and yet show how they interrelate because they are part of an infrastructure.

But there was an honest misperception that this S&T infrastructure was huge. Therefore, should it not participate equivalently in the downsizing? Certainly, we must participate in the downsizing. But I want that, particularly for science and technology, to be based on accurate information so the result is accurate and sized accordingly.

We may need your help there. There was a chart that Al put up that showed that 82 percent of the dollar investment is external in industry and university contracts. That is a number, please remember, because other associations in the Washington area are seeing

data on the total S&T enterprise across all of the services.

And the decisions that will be made short-term are more based upon aggregate numbers, not just the Air Force. We clearly operate on a different concept of operations with respect to the amount and nature of in-house versus external.

Not that we necessarily do it better than the Army and the Navy. We do it very differently. And the balance compared to the other services is substantial. They have more like 40 to 50 percent depending on location and so forth.

So again, we don't want to be peanut-buttered with respect to cuts that are based on the need to rebalance the in- and out-house balance. We want to set the proper goal and work toward that with the leadership and with the industries and universities so we do not lose the precious resources for science and technology as a result of misperceptions of something being out of balance.

We can move to any goal with your help, and we also need your help to communicate that a little better in some forums than we have been able to in the past. On the S&T initiatives or acquisition reform, I am happy to report to you that, in addition to those acquisition programs that are being considered by Colleen Preston for that set of efficiencies, we have three initiatives from the services and ARPA and DNA that have been generated through the Reliance process, and we are confident that at least one of those will in fact be part of the acquisition reform package.

We have in fact commissioned a Blue Ribbon Panel chaired by Dr. George Abrahamson, our Chief Scientist, populated with a number of present and retired senior military and civilian personnel who know the Air Force laboratory structure. It's also seasoned with some people from some other constituencies. Credibility is important, and we've asked them to examine — to reexamine the fundamental construct of the Air Force laboratory system so that in fact we will be prepared to adjust based upon that reexamination from the outside as we go through the inevitable downsizing and constriction of resources.

Even if we are able to hold the line, we

think it's important that we have a serious reexamination, although we have looked at this and acted in the past as recently as two years ago in forming the four Super Laboratories. Consolidation of Phillips Laboratory — perhaps not as great of an interest here at Wright-Patterson — but in fact we have made a decision to move in that direction.

The issue before the secretary will be whether or not to complete the full consolidation, pulling elements from the geophysics laboratory at Hanscom AFB, MA, other parts of our S&T program that are part of Phillips Lab at Edwards AFB, CA, and elsewhere actually to Albuquerque, N.M. That's a major resource issue. And the ability to move the right kinds of skills and so forth is important as well.

A lot has been said about dual-use technology transfer. I visited the Technology Transition Office yesterday. I was very impressed. There are about 50 people that General Yates has dedicated to finding, cataloguing, and putting in a form that it will be readily available to the American public for not only defense but for a private commercialization.

And those people are working hard towards that objective. In today's downsizing it is going to be very hard to retain that level of manpower investment if they aren't producing the kind of product that you say, you being representative of the American public, is vitally in your interest.

So I encourage you to find out who they are, what their phone numbers are, use them, and help them exercise the massive data which they have already aggregated. They are a little overwhelmed and they are just getting on track. But they need customer orientation and use in the near term.

Lab demo renewal. We have challenged Dr. Jones — and I think she's going to be supportive — to try to revitalize the lab demo which will give our laboratories the ability to operate effectively as stewards, particularly with emphasis on the quality of the people we're able to attract and retain.

In that regard, we might be able to use AFA help through your Worldwide Civilian Personnel Council to influence what we will be, through Dr. Jones, conveying to OPM [Office of Personnel Management] — some

special provisions for civilian personnel policy. That is one of our biggest constraints, particularly in a downsizing.

We don't have much elbow room as to how to do that, as you know, when we get into a reduction in force. One area of particular concern is that, as we downsize and if we get into a formal reduction, it's the young Ph.D.s that we have hired and recruited over the last couple of years that will go out the gate first according to the traditional OPM rules.

I don't think that's in the Air Force's interest or in the nation's interest because it is those young people who have the skills, who have the interest in the commercial as well as military and economic well-being of this country, that will become the agents of technology development and transition in the future as we readjust to this new world.

And finally, Defense Reliance. Gary was kind — we failed to show on the Reliance chart that Al showed — and I know Al feels terrible about it — that ARPA is a participant in the Reliance process.

They're coming up to speed. They have been participating, actually, for about a year. Gary has a staffing problem. The Reliance process is burdensome because the number of people and the topics are so broad.

But ARPA has bought into it to the level of its capacity and programmatic interest — full participation with us there.

So in summary, I think there are some very fundamental issues that we have to grapple with.

I intend to do the best job I can getting the new Secretary of the Air Force involved. She is a technologist. I think that is good news. We may get more help than we can stand. But in fact I think that's good news.

And, of course, I think you were impressed with Dr. Jones, our new leader at DDR&E. And she took the time on this trip to go out to the Wright Labs. She also promised to go to Phillips and Armstrong and Rome. And really understand, the one thing I asked her to do before we make any of these difficult decisions was to understand by going out to see and get the numbers right.

Because it's very difficult to — as you look across the total acquisition and science and technology enterprise to kind of sort all



this out. Because we all do things differently — not necessarily better — particularly across the services.

So that concludes my remarks, and hopefully, it stimulated some questions on your part. Thank you.

**GENERAL MARSH:** *And lastly now, before the panel questions begin, Kelly Overman, who is the General Manager of the Systems Development and Engineering Division of Westinghouse. Kelly?*

**MR. OVERMAN:** Thank you. It's very humbling to try to find something clear and useful to say in the midst of all this change and challenge. I'll try to keep my observations simple and summarize them in what I consider as three stark realities that we have to face and three real tough tests that we have to accomplish. First, the realities.

The first one is that I think everyone would agree that the world remains a dangerous place. Second, that the future holds significant and fundamental declines in the resources devoted to defense. And, third, that the public demands not just victory, but quick decisive victories with few casualties and little, if any, collateral damage. I think our challenges are pretty well laid out.

The U.S. currently enjoys a truly world class defense capability. Nothing could be clearer, given the end of the Cold War, and the illustration of Desert Storm. And this world class defense rests largely on technological leadership. And indeed, in many cases on technological dominance. Technology is also key to economic power. And, given the severe resource limitations, if we're not careful, we'll see a rapid erosion of technological superiority and military power as well as even quicker decline in our world dominant defense industry, which is arguably our highest tech industry.

It is so advanced that its exports have been sharply regulated, even in the face of cash buyers and increasing trade deficits. So just as we cannot satisfy the public demand for quick, clean military victory without technological superiority, the economic forces don't allow us to disband or allow to wander aimlessly a very large scientific capability. So if we are not to experience both military and economic declines, then three very difficult

tasks have to be accomplished.

First, I think that we must secure a better and broader funding base for our technology. Second, we must realize the quantum improvements in efficiency of the development acquisition process that have been discussed. Numbers like 40 percent are really big numbers. And third, we need to intervene in the precipitous fall in the procurement budgets.

Look at these one at a time. One way to secure broader sources of support is to choose the path of diversification and dual-use as we at Westinghouse have done. I would like to point out this path isn't for everyone. I think no aspersion should be cast on those who downsize quickly. Westinghouse is in the information and electronics business, and it is a much shorter jump from air defense to air traffic control than from fighter aircraft to automobiles. We find ourselves with expertise central to fast-growing commercial market segments and have significant momentum due to our start back in the mid '80s. In our case it's a question of continuing our diversification rather than searching for a place to begin.

I personally believe that those who quickly downsize and consolidate and those who push hardest and fastest at diversification, each based on their respective market position, are more likely to be correct than those who are indecisive.

We at Westinghouse have several encouraging examples of diversification to cite. We targeted three business segments, transportation, information, and security. In transportation we converted leadership in radar and air defense into a strong international air traffic control position.

We've recently developed a radar for commercial airliners that's much more reliable than current units, sells at a competitive price, and is sensitive enough to see and avoid wind shear events. Our commitment to clean air, jobs, and decreased dependence on foreign energy is exemplified by efficient high performance and affordable electric automotive propulsion systems.

In information and communication, we are currently building ground stations and mobile communication terminals that will provide seamless voice and data

communications over all of North America by allowing simple low cost calls directly to satellite. In security and enforcement we have developed smart police cars.

Beginning just three years ago, we now provide security monitoring for more than 200,000 homes. These examples and others were presented when President Clinton visited us. And I'd like to extend an invitation to any of you to visit and see our progress — and most importantly to meet the teams that are offering this future promise.

Another way to broaden the base that supports our technology is to stabilize our export policies, making long-term decisions on classes of systems rather than the current process which many of our foreign customers see as arbitrary and thus very risky. Funding to support and finance exports would also be a great help. And yet another way to broaden the base is to limit and balance government activities which compete with the private sector.

Much has been said about this — and I will only observe that the outcome is important — and that this avenue is one that is most under control of the defense establishment.

Moving to the second tough task, that of quantum improvements in development and acquisition process efficiency, we have here what I believe maybe the largest challenges.

There's no question that significant gains are to be had. I'll give you two examples of recent developments. We developed our commercial airline weather radar from project start to first flight in five months — a new pulsed doppler radar with a new signal processor, a new computer, new software, new receiver, a new solid state gallium arsenide transmitter. An integrated product team of about 30 people covering all the disciplines was given the challenge and rose to it. We also brought our first electric vehicle propulsion system from project start to the road in seven months with quality that has seen no failures in any of the vehicles in over a year of testing.

Others in the audience I know have had similar experiences that they can relate, and they all share one common thread. Pick your team carefully. Make sure the team understands all aspects of the challenge, and then empower them (read that, trust them) to pro-

vide a good solution.

If speed and efficiency are to be realized, then the authority to make trades and move out must reside inside the team and not outside it. If not, we will continue to be bound by a regulation-based process in which much check and review is mandated and little real empowerment to make real decisions resides anywhere in the structure.

Regulation seeks to control abuses by limiting authority and thus empowerment. Is it possible that we could limit the regulation phase to the team formation and move to a more trust-based process thereafter? It's a bit like a horse race. I would suggest that you go to the racetrack early, look at the horses, read their histories, watch them walk around. Then what I think we all have to do is place our bets carefully and get in the stands and cheer and not try to help them run.

The third tough task is to curb the precipitous drops and perturbations in procurement expenditures. I think we should realize that procurement supports the current technical infrastructure and controls investments in anticipation of future procurements. Procurement is dropping at rates that are two to three times faster than the average defense budget decline. It can be stabilized, not reversed or made flat, but just stabilized to a rate commensurate with the defense decline. I think we can buy the time for the tech base broadening and for the efficiency improvements.

So with three realities, dangerous world, large declines in defense budgets and ever-increasing public expectations, we have three tasks: broaden the basis of support through things such as dual-use and exports, improve our fundamental efficiency by moving more from a regulation-based process to a trust-based, and three, to allow some time for ourselves to succeed through stabilization in some of the budgets.

Being highly successful in all three tasks is probably equivalent to being successful in self brain surgery while juggling on a unicycle on a high wire in a gusty wind. And we are not going to get there on all of them 100 percent. But incremental improvement in each one won't do it either.

We're going to have to have a couple of these, at least one or two of them come to full

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flower, or I think we'll end up with the also-ran forces that we talked about earlier. Thank you.

## Technology Panel

**GENERAL MARSH:** *Excellent remarks. Before we proceed, Jim, I need to acknowledge that we're listening carefully to your challenge. I think you know the AFA well enough to know that we stand ready to help and we're going to do so.*

*Well, let's get started. IR&D is recognized as an important component, has been, of DoD S&T. As Anita Jones pointed out, that IR&D is an industry business decision. But isn't it likely to be reduced significantly in the aggregate across the board? Isn't this likely then to have an adverse impact on the overall DoD S&T program? I would be interested in both Kelly's view of this and yours, Jim.*

**MR. OVERMAN:** There's IR&D and IR&D. One can spend development money on a wide range of things. I think the concern is not only the retreat in magnitude but change in focus from the far term to a very near term focus. We could see IR&D move back by, let's say, 20 or 30 percent. What we might not recognize is that the other investments in anticipation of profits have gone down very, very precipitously. And those moneys that are still being expended are being expended on a much shorter time frame. So I think that we have to get through this period of refocusing so that one really knows what the game is, we all know what the game is, if we're going to have the objectives out here to get the proper decisions.

**MR. MATTICE:** I guess I'd just add I think it's inevitable that the amount of IR&D will go down because it is grounded in statute and implementing regulation based in large part on the amount of reduction. What Dr. Jones was alluding to this morning, I believe, was, in spite of that, there is a policy liberalization in terms of the industry's ability to

utilize whatever amount more broadly and more independently.

About a year and a half to two years ago, we had the government agencies, largely the services, NASA and so forth, go arm's length in the interaction with IR&D. We had an oversight role, particularly in the laboratories, which in some ways was burdensome because we filled out a bunch of forms. But also there was the requirement you may recall for these on-site reviews, which, from both sides of the fence I always got a lot of positive feedback, from the industry in particular, that these were very useful in just getting an input that is very difficult for companies to get. I led many of those on-sites with our aircraft industry. So I think we've lost something there. And I know Dick Paul at AFMC is trying to find with industry some way to reestablish the dialogue without the formal trappings or undue influence.

So I think IR&D is used not only by you, but by us as a precious resource in dollars as I recall. And I think Wright Lab had oversight of something like a billion and a half dollars. So it wasn't small change. And that was probably the largest group, but it was certainly an investment on the order of our core S&T program. And that's why we took it seriously.

Our concern was we've had to go more and more arm's length from that as a result of statutory change. So I think the industry and government need to really look at IR&D and determine how best to get the bang for the buck.

**GENERAL MARSH:** *Thank you. Gary, when Bill Perry was DDR&E, key technologies to be exploited included stealth and cruise missiles. What are the key emerging technologies of today and tomorrow, and can you describe how you will approach*

*prototyping them?*

**DR. DENMAN:** Okay. I think perhaps I would describe the key technologies in the context of such broad things like stealth and so forth, to be in information technology. Certainly that's where ARPA is putting its bet. I used that term, information technology, in a very broad context.

I don't just mean computers. I certainly do include the building blocks of computing, but I also go all the way to information processing from sensors and other sources to — particularly to feed, to use a former adversary's term — the precision strike complex which I believe is a key military capability, that we must stay on the very leading edge of that capability. I think that's where it is in terms of at least ARPA's perspective.

**GENERAL MARSH:** *Thank you. This is very specific. What it says is could you expand on the application of IR&D funds for commercial diversification activities. What are the limits? The suggestion here is, is it wide open to be used or must it pass some test of relevance?*

**DR. DENMAN:** Well, I think obviously the rules changed, and certainly pointed IR&D toward commercial activities particularly. I hope that gets translated into multiple market feeds of products and processes and so forth. In general, I think it is a very healthy thing. I think, although, it could be taken off into areas that really don't help the Defense Department, and I then become a little bit concerned. But from what I see happening so far, I think it's a balanced response to those new rules. So I'm not particularly concerned about it.

**GENERAL MARSH:** *Kelly, have you looked at those?*

**MR. OVERMAN:** I'm not sure anybody has written a definitive rule. I can tell you what I use to feel comfortable. If the return on the investment is earliest or at least half in the military side, and if there is no contractual requirement to pursue the area, preexisting, I feel comfortable with preserving that area with IR&D.

**MR. MATTICE:** I'm not an expert or policy spokesman on the matter, but, as I understand the basic policy and the major change, IR&D work that would impact the

economy, and it didn't say military economy, but the economy at large, the judgment is that the health of the economy is in the national security interest.

So that's a major new link, because what we used to evaluate when we were in the evaluative mode was the primary relationship of the technology and the activity to military needs. And second, that the effort was not germane to an instant production contract.

So if you think about it a minute, this is a fundamental departure — or not departure but expansion of the notion. I think it remains to be described in implementing guidance, just how far that could go. But if I were in industry, I could choose to say, if I have the IR&D resources and I can demonstrate that this postures me technology- and development-wise for a market, that would meet the test. Now, whether or not that still says that in turn may have military potential downstream, I think that's the fuzziness that is still somewhat a requirement.

**GENERAL MARSH:** *Very good. Gary, I'm sure you anticipated this one. It references the \$500 million available funding, and the fact that at least this person anticipated some 10,000 or so proposals. How will you manage the evaluation of this tremendous effort?*

**DR. DENMAN:** Well, the short answer is Jim Mattice has offered the whole Air Force laboratory structure, all 8,000 people, to help me do that. But we are — you know, I am concerned about the volume. I think some of these numbers of 10,000 are greatly exaggerated. But I'll know next Friday.

But I think we are pulling together a very large team. I think we have put in place a very definitive supportable, auditable process to go through. As you all know, in anticipation of this we put in the solicitation, the requirement for a five-page proposal summary that would address all aspects of the proposal both technical and business aspects. And we will do the initial screening of proposals based on those five pages. I expect to have upwards of 200 people reading proposals the first two to three weeks.

I am concerned that in just doing a five-page review and rejection based on five-pages, we might miss some good ideas. And I am concerned about that, but I believe we

have a very sound process in place and I believe the other agencies, including the Air Force laboratories, are providing us an enormous amount of help in getting through the first hump of this evaluation.

And I think, by the way, we have just added the Department of Transportation to this whole team. And they're sending some very good people to help in a few of the areas that they have the most interest in and the talent. So the team will be large and I think we'll get through it. I don't forecast any massive delays in the process, but perhaps slight delays if we really get 10,000 proposals.

**GENERAL MARSH:** *Very good. Jim, Anita Jones mentioned the bottom-up look at the S&T infrastructure in particular. Do you want to speculate on the outcome for the Air Force of such a look?*

**MR. MATTICE:** Not really. Not quantitatively. I am confident that the process for the infrastructure review is such that it will receive multi-level review of any recommendations. We candidly have not seen any quantitative recommendations.

I think it goes without saying that the infrastructure within the Air Force and the department will have to shrink just like the infrastructure in industry has shrunk. We wanted to make sure that that is commensurate with a future tech base, thinking 10 to 20 years downstream, recognizing that the systems that have performed for us so well, in fact, represent the technology base as people in industry as well as government saw it 20 or 30 years ago.

So that's our concern. And what I alluded to earlier is something that I think we will get sorted out very shortly. Dr. Deutch has indicated his willingness to take a harder look at the numbers. The way the data was initially gathered particularly in the other services, the systems engineering, test, and SPO manpower was rolled up and displayed in a thing called S&T. And that alarmed us. That's a big number. That's not representative, and so that's now being segregated and dealt with separately.

But sometimes first impressions are hard to change. And frankly, there are some views that at any number this balance of in- and out-house needs to be redressed. And we're more

than happy to do that. We want to make sure it's based upon a clear understanding of the roles — in our case the 20 percent of the investment and about 25 percent of the people in-house — the roles that they fulfill, not only hands-on research but the support systems, particularly in terms of quick reaction support, failure analysis, the support to acquisition programs, is fully appreciated. So the right size, and I think that's a better term, is done with a knowledge of the consequences.

**GENERAL MARSH:** *Thank you. Gary, I'm not sure this is exactly in your area of responsibility, but it deals with the critical technologies list and the associated plan with the new focus on dual-use. Both DoD and Commerce have critical technology lists. Is the Commerce list getting more attention in both the White House and the Pentagon?*

**DR. DENMAN:** Well, I think the fixation we went through on critical technology lists, and at last count I think it was eight of them in my office, from various industry segments and various departments of the government, I think we're not fixated on that question anymore, I don't believe. They are useful; that is, it is useful to go through the process to seek consensus on critical technology lists.

I believe that if you look at all eight of these lists they really aren't all that different. It's just where you find differences mainly in the taxonomy of how you slice up the technology world. So let me specifically try to answer the question. In terms of the technology list, whether it's Commerce's or DoD's, I believe it is fairly well harmonized if you look at the areas that we chose to focus on. I think many of the key areas are in fact compatible with what we're doing in the dual-use business. We're not doing everything that's on the critical technology list. In fact, that's the difficulty of having a critical technology list. Nobody ever prioritized it because they tend to cover very broad, large areas, and basically what you see reflected and what we've done in the dual-use business as well as our other parts of our program is in effect a prioritization of those lists.

With respect to a Commerce list vis a vis a DoD list, in terms of how the White House views it, I don't feel that question even roam-

ing around. So I think it's a non-issue.

**GENERAL MARSH:** *Thank you. I think maybe both Jim and Kelly would like to comment on this. There's much emphasis — as we heard from Allan Schell on the push for technology transfer out of the labs to industry — how can you assure a level playing field as you undertake this? Are there going to be favorites? And if there is a big success in a given industry or in a company, will that not come back in some fashion to haunt us?*

**MR. OVERMAN:** I guess I'm not sure what the question is. If it means that all successes should be mediocre and then everything's level, I don't think that's the point. Somewhere along the line we have to choose up sides to go compete in this world economy.

And one would think that any objection to fairness would have to be very early in the process. Deciding that it was unfair that someone succeeded after the game was played is a little late. I personally don't see or hear anyone complaining that they can't get any labs to work with them at this point in time. I would think that, should someone want to do that, you would be happy to respond.

**MR. MATTICE:** I think our philosophy will be first come, first served. Actually, I'm astonished by the magnitude of this kind of tech transition, tech transfer help. We've been in the last year trying to collect a little bit of data. For years the people in our labs have been responding to requests from companies and schools. They really like to do this.

They have a strong sense of their responsibility, and in the light of a new awareness as to the health of the American economy and a challenge from the President, it's okay to expend 20 percent of your resources.

One of the items on my list to Dr. Widnall is a dual-use tech transfer policy. We will put on her desk a policy statement that will make it very clear that it's okay to go that extra mile to take the products of your work. That will trigger a volume. And that's why General Yates wisely decided to structure a formal mechanism and dedicate more than just a few people. And they are concentrating on efficient mechanisms, databases, access tools, hotlines, to do that.

So we are thrilled by the opportunity, and I doubt, unless we are inundated like Gary is going to be inundated, with a wave, and there may be one as awareness goes, I think it will dampen out. And we intend to invest more resources there if we have it in people and dollars because the economy is in the national security interest. And so we see it in that light. We will always see our warfighter first.

But this is something that is an element which is not all that new. The formality of it, the emphasis of it presents a challenge to us. But I think we're going to rise to it fairly and substantially. If anybody feels in the course of trying to tap into it that you're not being treated fairly, please let us know. That was not our intent.

**GENERAL MARSH:** *Very good. This is for you, Jim, and others who care to add anything. Would you please comment on the need for a national test facility base that supports NASA, DoD and industry, including commercial requirements?*

**MR. MATTICE:** You told me you were going to ask Gary all the hard questions. There is about mid-course a national facility, national test facility study ongoing, jointly led by NASA and the Department of Defense. I sit on the steering committee for that.

And so it's too soon to tell just how this is going to come out but it's requirements-based. That was one of the strong themes that the Air Force tried to strengthen in the construct of this study.

So that's going to be put on the plate and that can be reviewed and acted on by the administration and the Congress. And it should come out here in the September time frame.

**GENERAL MARSH:** *Very good. Last question because our time is about up. There's an observation that much S&T, especially in manufacturing technology, has been accomplished as part of engineering development programs. For example, the F-117, the B-2, AMRAAM, J-Stars. Are we looking to make up this deficit, especially in the manufacturing technology S&T area?*

**MR. MATTICE:** Well, speaking for the Air Force — and I know Gary is one of the current and prior champions of this — we recognize that our focus technologically on product design and everything that goes with

that versus process design is part of the reason that we have been struggling economically — it is a national problem. And that is very true of the Air Force technology program. DDR&E and DoD just last year moved the DoD ManTech program to DDR&E.

That will be in Dr. Jones' portfolio. As guys who have led that effort in the past, Gary and I know how difficult it is to identify the dirty fingernail Man/Tech folks with the normal lab people. And we actually have been working that by moving key people into the leadership role. I think we've got a long way to go.

If you look at the dollars, the real investment in the process technology, manufacturing technology versus the total S&T enterprise, it is puny. I just was able to talk to a Japanese official, who heads one of the leading establishments in Japan. And if you look at their pie, half, fully half is invested in what we would call the process or manufacturing part of it.

And it's also not only larger by share, but it's highly integrated into the total technology investment. So I think we've got a long way to go. We're on the right path, but we've got some cultural and institutional and investment changes to make in our portfolio.

**DR. DENMAN:** I've been waiting for a long time to be asked this question.

**GENERAL MARSH:** *I know it's close to both of your hearts.*

**DR. DENMAN:** I think it's not a good question. Let me tell you why. For those of you that, for example, had the opportunity to

walk through the B-2 line and look at all the new manufacturing technology that's there, and you know anything about the Air Force investment in the ManTech program, you would find a large, very large fraction of what's there. I can say the same thing about other production lines. They had their roots in, those technology investments, in the Man/Tech program. I think we're into a silly question of who in the hell takes credit for what. I think it's nonsense. So thank you.

**GENERAL MARSH:** *Okay.*

**DR. DENMAN:** I don't feel strongly about it.

**GENERAL MARSH:** *Very good. Well, I want to thank this outstanding panel for a real contribution here this morning. And thank you, gentlemen. Super job.*

**GENERAL HATCH:** *Thank you too, General Marsh, for being the moderator. Let me just close by saying that the Air Force Association appreciates all the support that we've had from the Air Force Materiel Command. My thanks to Brian Green behind me who has done yeoman work and the AFA staff people who were here.*

*AFA's function here is to be a catalyst to bring DoD and industry people together. The topics we've been discussing are extremely important, not only to us as individuals but to the future of the country. And that is what the Air Force Association is all about.*

*On behalf of Jim McCoy, our president, and all of our national officers, thanks again. We stand adjourned.*





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